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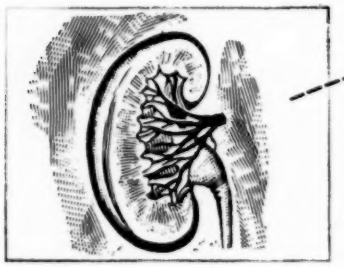

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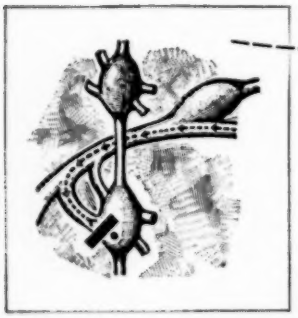

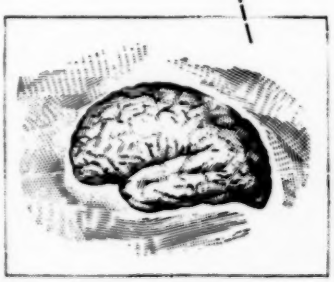

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MECHANISMS UNDERLYING SOME EPIGASTRIC SYMPTOMS

STEWART WOLF, M.D.

University of Oklahoma School of Medicine, Oklahoma City, Okla.

The epigastrium is a treasure trove of symptoms. It is usually defined as the area between the ribs and an imaginary horizontal line running through the umbilicus. This region is supplied with afferent nerves from spinal segments T-6 to T-10. These segments innervate a tremendous number of structures including the heart, esophagus, pleura, diaphragm, spine, abdominal skin and muscles, stomach, duodenum, pancreas, gall bladder and bile ducts, liver, spleen, colon and the retroperitoneal space. The sensations from all of these organs fall chiefly into two categories, pain and pressure. Nausea, too, may be located in the epigastrium.

In establishing the source of pain it may be helpful to observe carefully its position in the epigastrium but locality is not a very reliable criterion. Neither is the quality of the pain, because there isn't much variation in the essential quality of a deep pain. Pain gets its characteristics from the timing, associations and the things that accompany it. Thus, epigastric pains may be pulsatile, wavelike or steady. The relationship of the pain to the taking of food, to an empty stomach, the need to defecate, or to the act of defecation all provide separate characteristics.

COLON

An example of how the source of a pain can be identified by considering the timing as well as the distribution, and particularly the factors which aggravate and relieve it, is available in a study by Machella (1), which concerns a symptom-complex that clinicians used to call the splenic-flexure syndrome. This syndrome is characterized by pain in the precordial region, which may simulate coronary disease. It had been thought that a high splenic flexure might trap gas and cause pain. Machella, using very simple procedures was able to demonstrate the validity of this explanation. First, in a group of patients with low precordial or high epigastric pain he was able to establish that pain was relieved by the passage of flatus or by defecation. Then he took flat x-ray pictures of the abdomen while his subjects were having pain, and demonstrated a pocket of gas in the region

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of the sigmoid. The next step was to put a balloon through a proctoscope inserted into the sigmoid, introducing it up into the splenic flexure. Each time the balloon was forcefully inflated with air, the subject experienced pain in the precordium. Electrocardiograms taken simultaneously showed no changes. In another group of individuals with true anginal pain there was no gas demonstrable in the splenic flexure, and inflating a balloon in that area failed to reproduce pain.

DIAPHRAGM

Another puzzling epigastric symptom often confused with the pain of coronary artery disease is that produced by spasm of the diaphragm. There is usually an associated difficulty in drawing a full breath and often intense apprehension.

BILE DUCTS

The mechanism of another type of epigastric pain was explored by Bachrach (2), who demonstrated spasm of the common bile duct secondary to an anxiety-producing situation. With the use of a multi-channel recording device, he demonstrated spasm in the common duct accompanied by duodenal spasm during a period of stress occasioned by the patient's fear of the procedure. Since then, these studies have been repeated and it is clear that sometimes biliary pain which arises from common-duct spasm can be induced by the contemplation of troublesome life situations.

STOMACH AND DUODENUM

The stomach occupies a good deal of the epigastrium. The organ may behave in either of two ways which may give rise to sensations in the epigastrium. In a state of hyperfunction, the stomach mucosa becomes hyperemic and engorged, producing unduly large amounts of corrosive gastric juice and contracting unusually vigorously. The result is the characteristic symptom-complex of peptic ulcer—epigastric pain, particularly on an empty stomach, relieved by food and soda. Gastric hyperfunction may be painful, whether or not an ulceration exists in the stomach or duodenum (3).

The opposite type of reaction in the stomach, namely pallor of the mucosa, achlorhydria and delayed emptying is characteristically associated with feelings of epigastric fullness, anorexia and often nausea. On x-ray examination, the stomach is seen to hang like a bag, without contraction, and it fails to outline itself by grasping the barium within it. It is not possible to say that this gastric hypofunction is the mechanism of nausea. The site of end-organ stimulation for nausea is not known; neither is the mechanism of the stimulus. It is not even known which nerves conduct the sensation, because individuals who have had vagotomy and also sympathectomy (procedures which would presumably cut all afferent fibers from the stomach) still experience nausea. We do know, however, that a physiologic accompaniment of nausea is gastric hypofunction. Some individuals react characteristically to stresses in the life situation with gastric

hypofunction. They are usually those who respond by a pattern of alarm and withdrawal, rather than by fighting back. Such attitudes are associated with feelings of hopelessness and defeat.

Illustrative of such a pattern is the case of a 24-year-old single female, a stutterer, who came to The New York Hospital complaining of fullness in the epigastrium associated with anorexia and nausea. She had been rejected by both parents, had reacted to life problems with indecision and had attempted to resolve them by rationalization rather than by action. She felt that her own security and that of the Jews in general depended heavily upon the success of the Zionist movement. She was intubated with a gastric balloon and with another

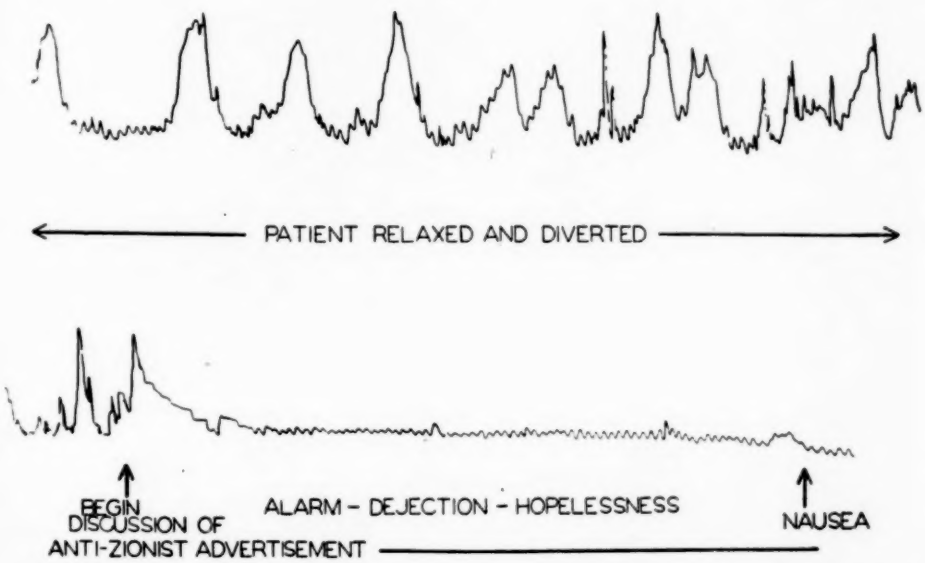

FIG. 1. Abrupt cessation of gastric contractile activity during alarm and feelings of hopelessness. Ultimately nausea occurred.

tube through which specimens of gastric juice were collected. The balloon was inflated in the stomach and connected to the kymograph. During a phase of gastric contractions of average frequency and amplitude, her attention was called to a newly formed society dedicated to opposing the Zionist movement and exposing what they considered misrepresentations by the Zionists. She had not previously heard of the society, and she appeared horrified to learn of their activities. Pale and wide-eyed she stared at the examiner, immobile and obviously frightened. The motor activity in her stomach promptly stopped. The organ relaxed and increased in size. Finally nausea occurred. The gastric changes are illustrated graphically in Figure 1. Later discussion revealed that this individual characteristically reacted to threatening situations with anxiety, in which there were strong feelings of hopelessness and despair. "When something comes up to worry me, I have a feeling of being defeated, that things are hopeless. That is how I felt when you showed me that advertisement of the anti-Zionist organization."

Comment: This type of gastric disturbance, seen commonly among soldiers in the horrifying anxious circumstances of combat (4), was recognized several years ago by Walter Cannon (5) and it was long thought to be the only way in which the stomach reacted during stress. In recent years, however, numerous workers have shown that as the face may blanch or blush in varying situations of stress, so may the stomach become either hypoactive or hyperactive, depending upon the situation and the individual.

A series of observations was performed in which a triple-lumen balloon was introduced into the stomach and allowed to go on through into the duodenum.

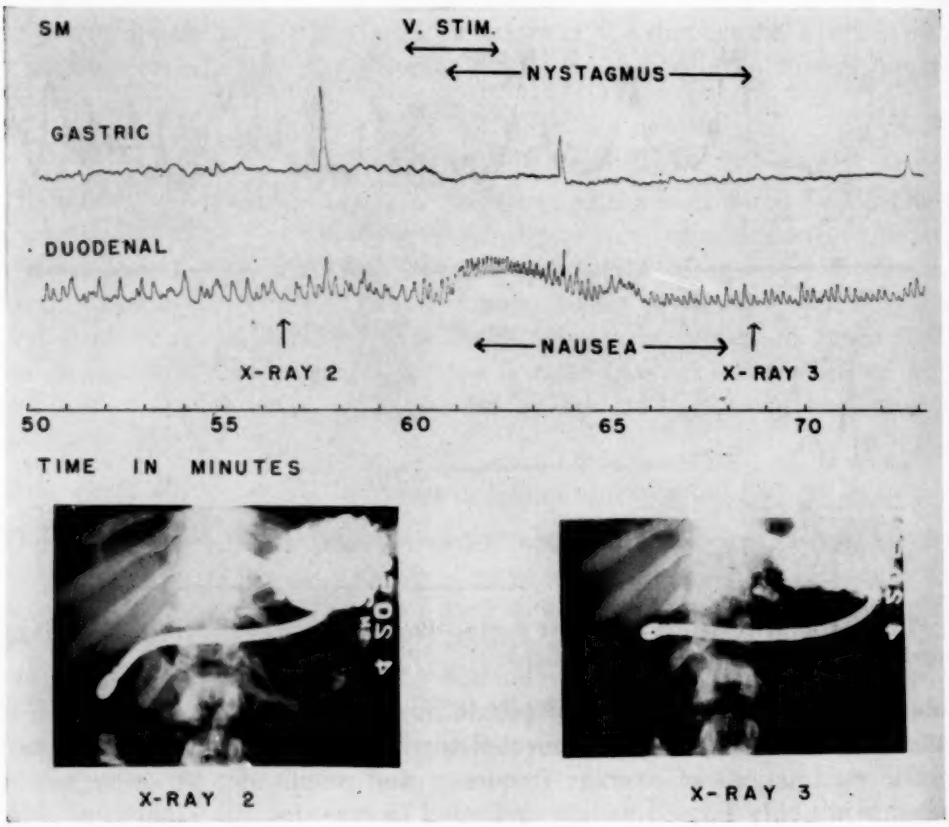

FIG. 2. Simultaneous tracings of gastric and duodenal activity, showing gastric atony and brief duodenal spasm during nausea induced by vestibular stimulation.

The balloons were inflated in the stomach and in the first portion of the duodenum and attached to a recording device. The third lumen communicated freely with the stomach so that gastric juice could be withdrawn or barium introduced. Figure 2 shows tracings of gastric and duodenal contractions. In this individual, at this time, the stomach was not very active. The duodenum was showing an average degree of activity. After a control period the subject was exposed to vestibular stimulation with cold water. Nystagmus and nausea developed. Gastric motor activity stopped altogether but the duodenal segment

went through a transitory period of spasm. The tube was regurgitated back toward the stomach. The brief duodenal spasm, like the sustained gastric atony, cannot be said to be part of the mechanism of nausea, although it is a regular accompaniment of nausea. It is important to note that duodenal spasm may occur, especially during stress or boredom, without any abdominal sensations being felt by the subject.

In Figure 3 is shown an individual in whom active gastric contractions were taking place in association with an average amount of duodenal activity. After a control period of observation the subject of pregnancy was brought up for discussion. The effects were the same as those of apomorphine, ipecac, mus-

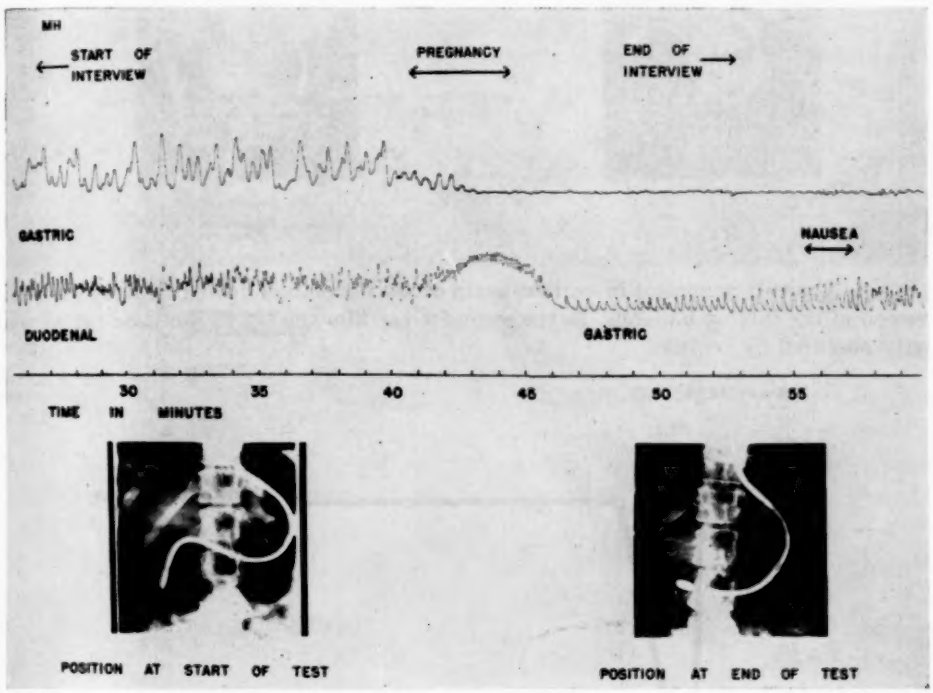

FIG. 3. Gastric atony, duodenal spasm and nausea induced by discussion of pregnancy.

tard water or vestibular stimulation, namely, interruption of gastric activity associated with transitory duodenal spasm (6). The tube was regurgitated back into the stomach so that the distal balloon was recording waves from the pylorus itself. In Figure 4 both balloons were in the duodenum, one in the proximal and one in the distal portion. Again, during vestibular stimulation, duodenal spasms occurred and the tube was regurgitated back toward the stomach.

As indicated before, many individuals react characteristically to threats in their day-to-day life situations with the pattern of gastric hypofunction accompanied by its sensation of epigastric fullness, anorexia and, if hypofunction is marked enough, nausea. Although a fistulous subject, Tom, usually reacted to threats in his day-to-day life experience with his fists up, red in the face, hot under the collar and red in the gastric mucosa, he sometimes responded with an atti-

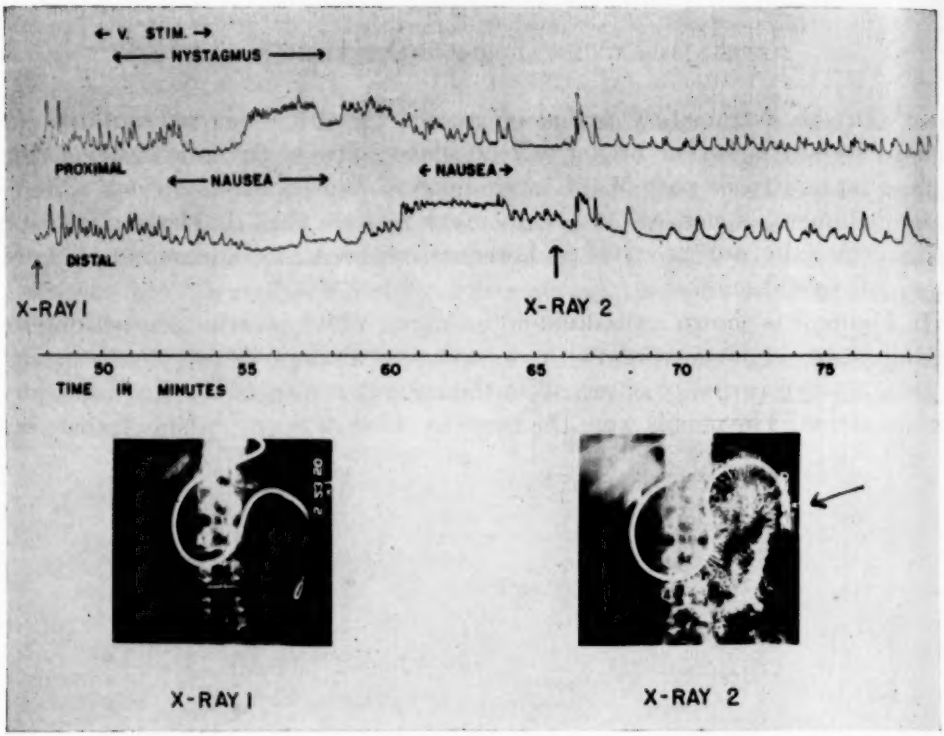

FIG. 4. Transitory spasms in various parts of the duodenum during nausea, with retrogression of the inlying balloons. In the second x-ray film the tip of the tube (at arrow) is partly obscured by barium.

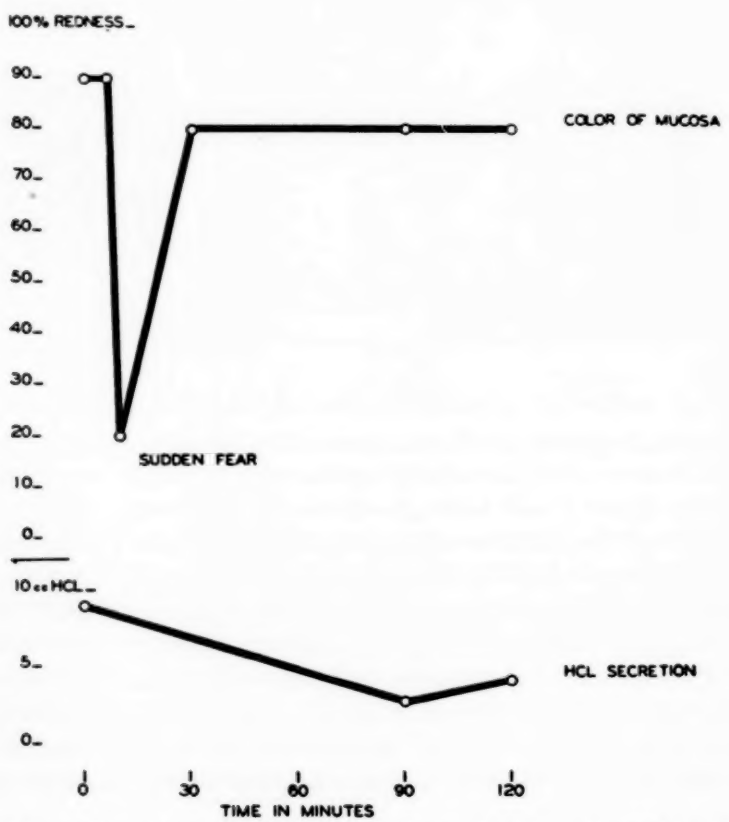

FIG. 5. Sudden pallor of the gastric mucosa during sudden transitory abject fear. (Fistulous subject, Tom.)

tude of being defeated, overwhelmed, frightened or rejected. Under those circumstances he was usually pale in the face, listless, underactive, underassertive and pale in the stomach. Figure 5 illustrates a situation in which sudden fear occurred one morning during the control period of accelerated gastric function, when an irate doctor, a member of the staff, suddenly entered the room, began hastily opening drawers, looking on shelves and swearing to himself. He was looking for protocols to which he attached great importance. Our subject, who tidies up the

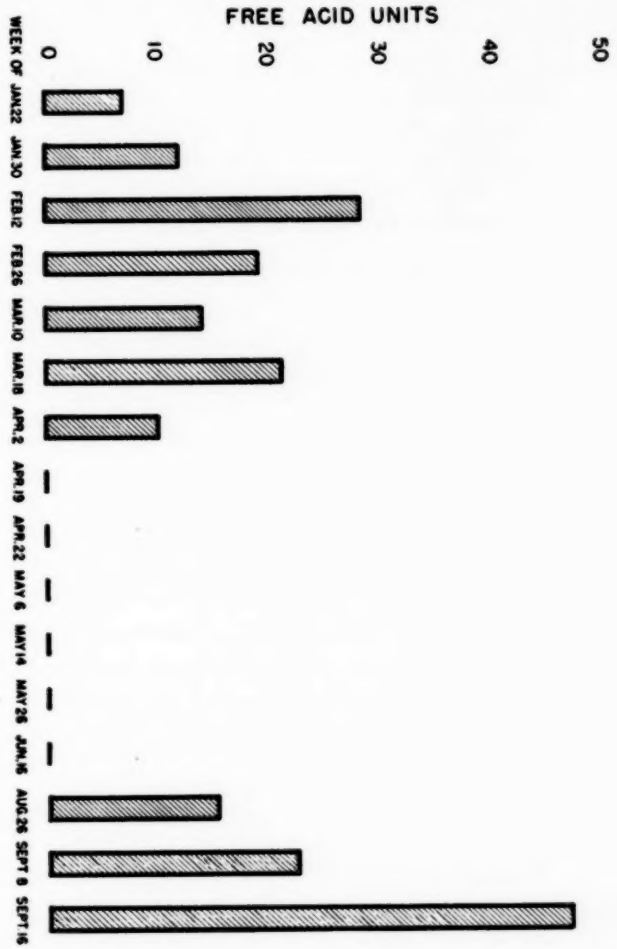

FIG. 6. Prolonged gastric hypofunction during a period of dejection and discouragement caused by an incident in the laboratory. Gastric achlorhydria was associated with anorexia, fullness, nausea and a 12-pound weight loss.

laboratory, had mislaid them the previous afternoon and he was fearful of detection and of losing his precious job. He remained silent and motionless and his face became pallid. The mucous membrane of his stomach also blanched from a level of 90 to 20 on the color scale and remained so for five minutes, until the doctor had located the objects of his search and left the room. Then the gastric mucosa gradually resumed its former color.

On one occasion the pattern was sustained for two months, associated with anorexia, taciturnity, loss of drive and a weight loss of 12 pounds. This occurred during a set of experiments involving continued suction on an indwelling duodenal tube. These observations were particularly distasteful and frightening to Tom. His fear and feeling of helplessness were accentuated when one day a technician, in whom he had never had full confidence, drew blood through the suction apparatus in the duodenum. As shown in Figure 6, Tom's stomach contained no free HCL for several months following this episode; and until a job was secured for the technician in another hospital, Tom was continually complaining of anorexia, epigastric distress with bloating and often nausea. On the day after she left, acid reappeared for the first time in the gastric samples. Appetite returned, the epigastric discomfort vanished and Tom again became his jovial, energetic, quick-moving self.

SUMMARY AND DISCUSSION

These illustrations serve to indicate how some troublesome epigastric symptoms occur. Among the most important stimuli to dysfunction in the epigastrium are life situations which have an important threatening significance, consciously or unconsciously, to the individual. Although the hypochondrium is part of the epigastrium, rarely are epigastric complaints hypochondriacal. It is almost always possible to find a mechanism adequate to produce the symptoms. In order to accomplish this by clinical diagnosis it is important to use the facilities at our command, the timing, the aggravating and relieving relationships, and simple manipulations such as Machella employed. Once the mechanism has been established, the factors which throw it into operation can be explored.

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THE CORONARY PROBLEM IN RELATION TO AGING*

ROBERT L. LEVY, M.D.

The Department of Medicine, College of Physicians and Surgeons, Columbia University and the Presbyterian Hospital, New York, N. Y.

It may seem presumptuous to enter into a discussion, however limited, of a relationship between two conditions of which so little of basic importance is known. The factors governing the aging process, thus far, have eluded detection; the disordered bodily mechanisms causing atherosclerosis, which is responsible for over 95 per cent of coronary heart disease, remain veiled in obscurity. In both instances there has been but little advance beyond the descriptive phase. Yet certain facts have emerged which are of value in indicating paths for future investigation and some are of immediate clinical usefulness.

Very few human beings die a "natural death," by which is meant a death dependent solely on the aging of tissues and organs. Almost invariably disease, of one sort or another, initiates the terminal event. As Robertson put it thirty years ago, "in actuality death is always in some measure accidental" (1). Symptoms of failure of the circulation, proved to be due solely to aging of the myocardium, appear to be extremely rare. Disorders caused by the "senile heart" described by some of the earlier writers (such as Balfour (2)) were, for the most part, confused with those caused by coronary heart disease. Recent authors who have attempted to delineate a clinical picture referred to as "presbycardia" or "senile heart disease" have not documented their cases by postmortem studies (3). In extreme old age the myocardium does show atrophy of muscle cells, brown pigmentation and interstitial fibrosis. But almost invariably some degree of coronary atherosclerosis is also present.

It is known that men are more subject to coronary sclerosis than women, in a ratio of 4 or 5 to 1. Coronary disease is rare in females prior to the menopause, whereas it is not uncommon in males before the age of 40; numerous examples were observed in young soldiers, from 18 to 39 years of age, in the second world war (4).

The opinion has generally been held that the incidence of coronary atherosclerosis, as evaluated from necropsy material, increases progressively with age (5). This is true. However, a recent study appears to indicate that such a direct parallel does not exist with respect to the degree of vascular change. At the Mayo Clinic, a restudy was made of the hearts of 100 consecutive men from each of the decades from age 30 through 89 years; the group thus comprised 600 hearts. It was found that the degree of coronary atheromatosis did not show a linear relationship to age but increased rapidly in the 30-year through 49-year age period, reached a maximum in the 50-year through 59-year group, and there-

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after remained at a fairly constant level. It was concluded that beyond the age of 49 years, the average man at the time of death has a rather severe degree of atherosclerosis at some point, in both left and right coronary arteries.

It is now conceded that atherosclerosis is not an essential concomitant of advancing years but, in Aschoff's words, is "a malady or an affliction of old age superadded to the ordinary process of aging" (7). It is characterized by the deposition of lipid material in the intima of arteries, in contradistinction to medial or Mönckeberg's sclerosis, in which the lumen of an artery is rarely narrowed or occluded. In the light of current belief, the underlying predisposition to atherosclerosis appears to be a defect of lipid metabolism, involving chiefly cholesterol in the form of lipoproteins. Whereas it has been claimed that the cholesterol of the plasma and tissues is derived largely from preformed cholesterol ingested in the diet, this notion is no longer tenable. In man, certainly most of the body cholesterol is synthesized from acetate derived from proteins and carbohydrates as well as fats in food. It is clear, therefore, that elimination of preformed cholesterol from the diet is a useless gesture, unsound in principle. On the other hand, curtailment of caloric intake and the avoidance or control of obesity may decrease the extent of cholesterol synthesis. Even if it has not been shown conclusively that such restriction will prevent or retard the sclerotic process, it seems desirable to recommend it until a better approach has been demonstrated. There is some evidence in its favor.

The reasons for the high incidence of coronary heart disease in older members of the population in this country are not clear. If the thesis of a defect of lipid or lipoprotein metabolism is correct, this disorder is a common one. The suggestion has been made that it is a result of over-eating associated with a relatively high standard of living. It has been demonstrated that, in apparently normal subjects, concentrations of cholesterol and the S_f 10–20 lipoprotein fractions of Gofman are lowest in early adulthood, rise to a maximum in the fifties and show lower values in the sixties (8). The trends in both are not significantly different on the basis of present data. According to Barr and his associates, the plasma beta-lipoproteins are, in general, lower in young women than in young men between the ages of 18 and 35; however, they reach about the same, but higher levels in both sexes between the ages of 45 and 65 (9). These figures are in accord with other pieces of evidence, already mentioned, on age and sex differences in coronary sclerosis. All of such observations are guideposts on the way to more precise knowledge, and are supported by clinical experience.

Both in the living subject and in the heart at necropsy, it can be demonstrated that changes frequently take place in the coronary arteries which are unaccompanied by symptoms. Such changes may be progressive or regressive in character. During life they can be recognized by significant alterations in serial electrocardiograms. The following history serves as an illustration:

CASE REPORT

A male lawyer was 60 years of age when first seen prior to a hemorrhoidectomy in March 1941. There were no symptoms referable to the cardiovascular system.

Examination showed moderate retinal sclerosis and a blood pressure of 182/106 mm. Hg.

The heart sounds were clear. Measurement of the cardiac silhouette in the 2-meter film showed slight enlargement to the left and moderate diffuse widening of the aorta.

The patient was examined at frequent intervals until his death, eleven and a half years later. He went to Florida in the winter, to Europe in the summer and managed, in addition, to carry on an active international law practice. He danced, golfed and swam without discomfort. The blood pressure remained elevated. In 1946, transurethral prostatectomy was performed, without untoward incident. The blood pressure continued to rise and the heart became larger. He was started on a low salt diet. In 1950, he had an attack of pulmonary edema followed by signs of frank congestive failure. He was then 70 years of age and consented to give up golf, dancing and swimming, though reluctant to do so. During the

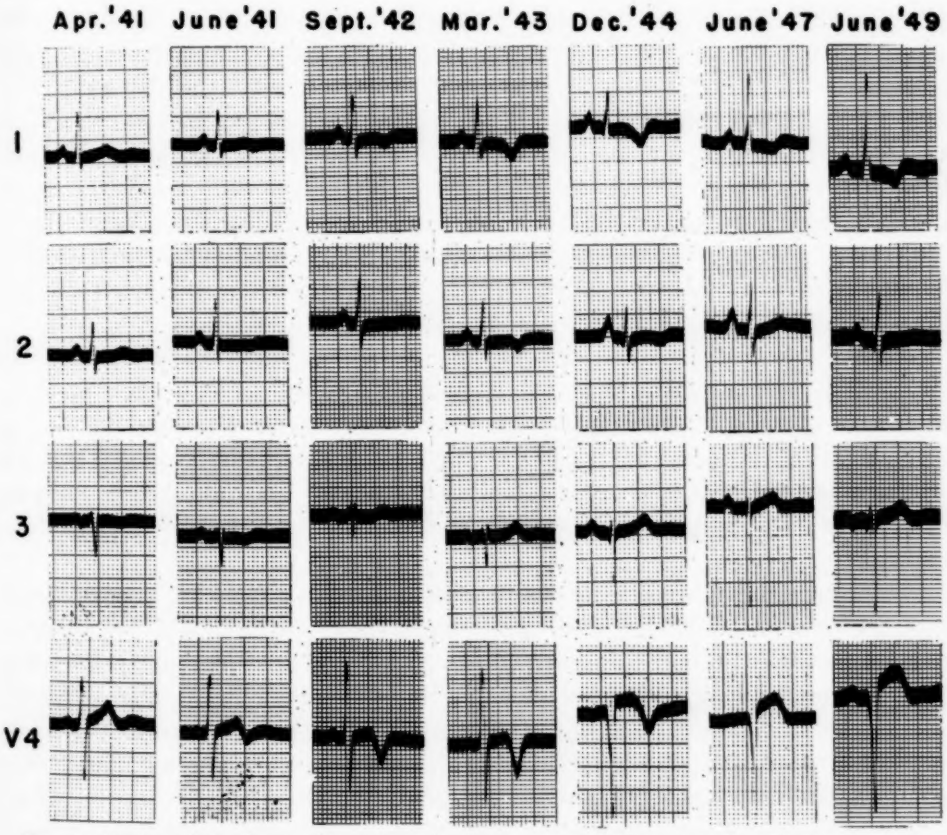

FIG. 1. Series of electrocardiograms of a lawyer, aged 60 years when first seen (case report in text). Throughout this period there were no symptoms of cardiac or coronary insufficiency.

next two years the blood pressure rose to 258/146. He had several small cerebral vascular accidents without focal signs. His mind became clouded and he died in coma at the age of 72. At no time during the entire period of observation did he complain of anginal pain; and during the last year of life there was no evidence of congestive failure.

The series of electrocardiograms pictured in Figure 1 shows changes which, if taken by themselves, would lead to the belief that lesions of serious consequence had occurred in the heart. These records were taken during the years preceding the onset of manifest cardiac and cerebral disturbances. Certainly there were occlusions in the coronary bed; but these apparently developed grad-

ually and in the presence of an adequate collateral circulation. Numerous determinations of the sedimentation rate and counts of the leukocytes were made, but no increase in either was found. If infarction occurred, the area of involvement was not of sufficient size to cause a systemic reaction.

That complete occlusion or marked narrowing of one or more coronary arteries may occur without giving rise to clinical signs or symptoms and without having produced serious myocardial damage has been demonstrated by Blumgart, Schlesinger and their associates, in hearts injected and subsequently dissected by a special technique (10). They have shown that an adequate collateral circulation develops, chiefly through interarterial anastomoses, which become larger as the need for their existence increases. However, even though marked injury may be avoided by the development of such a chain of collaterals, the margin of safety or "coronary reserve" is reduced and, eventually, as in the case just described, may become exhausted. On the other hand, the formation of a collateral bed may result in regressive changes in the myocardium, as indicated by favorable modifications in the form of the electrocardiogram. Occasionally, bundle-branch block, or even complete or incomplete auriculoventricular block, disappears in the course of weeks or months, with coincident clinical improvement.

It might be argued by those critically inclined, that adoption of a more conservative program would have helped to prolong the life of the lawyer. Such an inference is open to question. But judgment was influenced by circumstances; he was divorced after an unhappy marriage, he enjoyed his pleasures and his work, and felt well up to two years before his death. For almost ten years he lived as he wished, in spite of obvious signs of gradually progressive hypertensive cardiovascular disease.

In older persons with coronary heart disease, particularly those over 60 years of age, a liberal policy with respect to management is justified. The figures cited for the degree of coronary atheroma indicate that the peak is reached between 50 and 59 years and it is in the same age group that the highest concentrations of cholesterol and large lipoprotein fractions are found in the serum. The sixth is truly the "dangerous decade." In a recent paper, the view was expressed that needless restrictions often are imposed on cardiac patients (11). To protect himself, as well as the patient, the doctor tends to err on the side of caution. Successful management calls for precision in outlining a regimen. Among the items to be discussed are diet, rest, exercise, work, smoking, consumption of alcohol, ascent of stairs and air travel. Prohibitions should be prescribed as sparingly as is consistent with good judgment based on current knowledge. For, regardless of our efforts, atherosclerosis tends to run its course and will continue to do so until the fundamental mechanisms responsible for its occurrence are more fully understood. Only then will it be possible to institute effective measures for its modification and, perhaps eventually, for its prevention. It is ever our aim, as physicians, to prolong life; but in our eagerness to increase its length let us not, without good reason, narrow its scope.

SUMMARY

Coronary atherosclerosis is not inherent in the aging process but is a superimposed disease, currently ascribed to a defect in lipid metabolism. Its incidence increases with advancing years. The degree of vascular damage is maximal in the age-period from 50 to 59, so that the sixth properly may be called the "dangerous decade." In outlining a regimen for older persons with coronary heart disease, unnecessary restrictions are to be avoided. The physician, in his efforts to add length to life, should not, without sound cause, curtail its breadth.

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AMERICAN GERIATRICS SOCIETY

PANEL DISCUSSION

C. L. Reeder, M.D., Moderator

THE INSURANCE COMPANIES AND THE AGING POPULATION

LIFE INSURANCE*

HOWARD B. BROWN, M.D.**

Massachusetts Mutual Life Insurance Company, Springfield, Mass.

It is a pleasure to open this discussion by mentioning briefly certain features with reference to insuring the lives of older persons. In the past these folk were considered hazardous risks, and most companies offered restricted plans with age 65 as the top limit of acceptance. This was due to two related factors which combined to cause antiselection.

Insurance companies select policyholders with some skill, but the risks preselect themselves with greater effect. Consciously or subconsciously, many people possess a self knowledge of health which enables them to outguess the physicians who examine and attempt to classify them. Annuity buyers, as a group, always outlive the purchasers of insurance. This is called antiselection.

It occurs at any age, but hidden impairments are more common and better concealed when the period of degenerative disease has been attained. A dizzy spell, which may be functional at the age of 30, is more ominous at the age of 70. Think of the number of persons with early cardiovascular disease in whom symptoms develop without signs.

In addition, there appears to be a diminishing need for insurance, as family and business responsibilities wane. A lack of true insurance needs is characteristic of the most dangerous type of mortality bargain-hunter. Insurance to fulfill a purpose is difficult enough to sell—when the requirement is not apparent, it often lies in the realm of antiselection. Because of these factors, one might guess that insurance companies would become more cautious in servicing the elderly. The contrary is true.

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** Medical Director.

During the more recent years, there has been an improvement in the mortality of older persons which was reflected in insured lives. In the age group 65–74, the mortality of white women in the United States registration area fell 25 per cent between 1930 and 1949, while male mortality fell 9 per cent in this period, the improvement being due mostly to the effects of modern medication on respiratory infections. Insurance experience with the age-70 group showed 62 deaths per thousand prior to 1868, 61.5 per thousand just before 1918, and only 47.4 between 1946 and 1949.

The increase in taxes has broadened and extended the insurance needs of the later years. An estate requires this coverage to offset shrinkage, and large income taxes may be partially counterbalanced by certain types of insurance.

With improved mortality and an expanded field for insurance, it would be strange if our companies did not meet the needs of the segment of the population over the age of 65, which increased 37 per cent in the decade from 1940 to 1950, as contrasted with an increase of less than 13 per cent in persons under the age of 65. At present, there are 12,300,000 oldsters—1 in each 12 of the population, as contrasted with only 1 in 25 in 1900.

Our increased confidence has been reflected in lower insurance rates at these ages, by larger maximum amounts, by extended use of plans containing greater insurance risk, and by increases in the ages of acceptance. Of 118 of the larger companies, 48 now insure to the age of 70, 3 to the age of 75, and some have no definite top limits. It is true, however, that most companies still limit the maximum age of acceptance to 65.

Although the greatest impact of the miracle drugs may be past, we may expect a continuation of mortality improvement as our public health agencies and facilities expand and spread. There is reason to believe that persons may enter the later decades in better condition, and medical research continuing along the lines of degenerative and neoplastic disease may provide something startling in the way of prophylaxis or treatment. It is difficult to conceive the fundamental changes which would be brought to our physical and mental lives by some success in dealing with atherosclerosis.

I wish that I could say more about the prognosis of individual impairments. As a matter of fact, our insurance mortality statistics come largely from lives insured at younger ages and we have, as yet, few data concerning individuals first insured over age 65. In selection, we are more lenient with systolic hypertension, arteriosclerosis, diabetes mellitus, and certain other impairments in which the inroads of advancing age are expected though not desired. We of insurance medicine shall be happy to receive any information which may be supplied with regard to the prognosis of various symptoms and impairments in individuals of mature years. In the cardiovascular field we are particularly interested in establishing normal blood pressure and electrocardiographic standards, and in the prognosis of various stages and types of arteriosclerosis at ages over 65. The specialties of geriatrics and insurance may exchange information of great value in the coming years.

RETIREMENT PLANS*

PAUL V. REINARTZ, M.D.**

The Prudential Life Insurance Company of America, Newark, N. J.

Prior to 1947, the mention of retirement plans called to mind simply a plan in which employers in business or industry set up annuity funds for their employees, to be paid out after retirement of the individual employee. The payments were based on a fixed retirement age and the amount depended on position attained. When the day arrived, the employee was advised of the amount of his benefit; there was perhaps a party or two, and a certificate of service and appreciation. On the appointed date the individual went out into the cold, cold world of retirement. Such plans then were simply a matter of arithmetic—the pay-off on an actuarial computation.

Since 1947, the concept of a retirement plan has changed greatly. With a rapid increase in the number of persons over 65 years of age to 13,000,000 this group of people is becoming vocal in that cold world referred to. Their social and economic impact can no longer be denied. Their problems will increase as the group increases in number—20,000,000 by 1975.

In our steadily aging population soon 1 person in every 7 in the United States will be over the age of 65. The financial load imposed on our actively working population in carrying these 13,000,000 people as dependents could be staggering, and perhaps even ruinous to our economy. Just the loss of productive effort on the part of this large group would run to many billions of dollars. Fortunately, one third of our population in the over-65 age group are actively at work in production. In another group, 1.5 million persons are capable of working but have no work to turn to, with a resultant annual loss of 3.5 billion dollars in production.

In the light of these facts employers, employees, the unions, the medical profession and many welfare and government agencies are engaged in widespread discussions and research into what constitutes the proper age for retirement from active work or productive effort. The trend in the past has been to accept age 65 as a rational date. This trend was strengthened by the passage of our social security laws. However, in present thinking the debate and discussions revolve around two decisions:

1. Shall we adopt permanently for our working people the age-65 rule on retirement?
2. Shall we adopt selective retirement, in which case there would be a gradual tapering off of activity of the older worker.

Those who have studied this problem closely find that there is no uniformity in attitude on the part of any one of the groups mentioned, namely, employers,

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** Medical Director, South Central Home Office, Jacksonville, Florida.

employees, the unions and other agencies. When it comes down to actual practice in individual firms, some insist on the age-65 plan, whereas others are working with various selective retirement plans. Examples would be:

a. Workers over the age of 65 to take one month in twelve on work furlough.
b. One day a week off. A four-day week.
c. Work half-time each day.

No work curtailment plan, so far as is known, applies to employees beyond the age of 70.

The object of a reduced work program after age 65 is:

1. To have the production of the worker, even though on a reduced scale.
2. To lessen the psychic shock of a sudden and complete retirement.
3. To give the individual over 65 the opportunity to build up his or her income, when the pension plus social security is not equal to current obligations.

I should like now to refer to a particular phase of retirement plans and that is the element of "retirement shock," a term which is coming into general use. It represents the sum total of the physical, mental and social effect of sudden retirement on the individual, at the time when the economic factor of reduced income also strikes him. Some of the ingredients of retirement shock are:

1. Loss of incentive to live and carry on.
2. Loss of a sense of personal worth and accomplishment.
3. Loss of social contact with fellow workmen, this contact for many persons being their only social outlet.
4. Loss of self-respect and the respect of others.

Medical science has added years to the average life of our people, but we have thus far not met the challenge of teaching the elderly to live as socially useful individuals. Emphasis in this young country has been on youth and production. We have, up to this time, dwelt on the infirmities and limitations of the older individual, rather than on his remaining and very real capabilities. Now, we have been made increasingly aware of the impact of this mounting array of millions of people over the age of 65.

It is heartening to all of us who have an interest in this problem to see the rapid strides being made in meeting this challenge.

I can mention briefly the work of:

The New York Commission for the Care of the Aged.
The Illinois Commission for the Care of the Aged.
The city-wide programs of Cleveland, Chicago, Philadelphia and Detroit.
The research work in the Sociology Departments of Princeton, Harvard and Yale.

Throughout industry we see a rapidly increasing interest in setting up pre-retirement and counselling plans, to enable the individual workman to make a better adjustment to his or her retirement. Just as we train our children to make their adjustment to an adult life, as we train our youth to find careers, and as we teach a workman to master his job or his trade, so must we teach our millions

of aging and retired people to live successfully during that average twelve to fifteen years which remain to them. To accomplish this end will require all the ingenuity and resourcefulness which we can bring to bear on this challenging problem. May I repeat the oft quoted statement of Dr. Howard Rusk, who has done such monumental and advanced work in rehabilitation: "Next to solving the problem of finding a permanent Peace, there is no more important social problem facing the American people than this problem of the care of our aged people."

DISABILITY INSURANCE*

H. R. LEFFINGWELL, M.D.**

The Paul Revere Life Insurance Company, Worcester, Massachusetts

Disability insurance is a rather broad term that has many ramifications extending into the field of life, health, and accident insurances. The type of disability insurance to be discussed in this paper is known by a number of terms:

1. Accident and health insurance
2. Sickness and accident insurance
3. Loss of income insurance
4. Weekly indemnity insurance
5. Loss of time insurance
6. Cash sickness insurance

In order that we may more clearly understand each other in the discussion period to follow it seems necessary to give a general outline of the subject, including the more common types of coverage, some general underwriting practices and problems, and also some of the additional benefits that have been added in recent years.

Disability insurance is issued as an individual policy to the individual applicant or as group coverage to the employees of a business or industrial organization. Still a third type of plan that has grown in popularity during the past few years is association group coverage or franchise insurance. It is not pure group coverage, since there is no employer-employee relationship; it is rather a method of mass purchasing by individuals in a common profession.

Disability insurance indemnifies the policyholder for a specified weekly or monthly amount while disabled. Underwriting experience has shown that it is not practical to insure an individual to the extent of 100 per cent of his earned income, and neither can unearned income be considered when evaluating the amount of disability coverage one is entitled to carry. For incomes under $750.00 per month most companies feel that an applicant can be insured to a total of

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80 per cent of earned income. Different companies also have individual maximum retention limits. It is necessary to exercise caution in underwriting an applicant who has an unearned income of any importance or a man who has a business, large or small, with capable assistants who are able to keep the wheels turning during his absence. Many of this class, particularly in the north, develop disabilities during the winter months and frequently find it necessary and beneficial to go to Florida or California to recuperate.

Companies also have an age limit beyond which they will not issue individual disability insurance. This age varies with different companies and with different types of policies; it is usually 55 or 60 years for health insurance. The reason for this is the fact that as one approaches this time of life there is more likelihood of his becoming disabled and he is usually disabled for a longer period. Also there is no longer a period of years in which to build up a cushion of premiums sufficiently adequate to take care of the more severe illnesses that occur in the later years. A premium adequate to take care of these losses would be prohibitive.

The following table illustrates what happens to disability insurance in the older age groups. The figures are taken from policies issued prior to 1918—before the company with which I am associated began to write only noncancellable disability insurance; even though the contracts were cancellable with no age of termination, the company has continued to treat them as noncancellable and a large number are still in force. The result has been some very interesting statistics.

1. In the 65–66 age group, among persons whose policies are still in force, the loss ratio is 103 per cent, *i.e.*, for every $100.00 collected in premiums we have paid out $103.00.
2. In the 70–71 age group, the loss ratio is 153 per cent.
3. In the 75–76 age group, 119 per cent.
4. In the 80–81 age group, 236 per cent.
5. In the 85–86 age group 361 per cent.

These statistics illustrate clearly that, generally speaking, disability insurance is not designed to protect against the degenerative diseases associated with old age.

Individual loss-of-time policies now generally have a termination date; usually they do not pay for disabilities originating after the 65th birthday. They also have restrictions as to the length of time they will pay benefits for any one continuous disability.

The lifetime coverage that was sold rather freely prior to the depression years of 1930–1933 was a very expensive experience for those who wrote it and today most of us feel that ten years is as far as sound underwriting should go.

Applications for individual disability policies are individually underwritten, and the more liberal the coverage applied for, the more strict are the underwriting requirements. Impaired risks *buy* disability insurance—healthy people have to be *sold*.

Individual disability policies can be written with first-day coverage for sickness or with a waiting period of ten, fifteen, thirty, sixty or ninety days. There is, of course, a reduction in premium—the longer the waiting period the greater

the reduction. There is a recent trend toward a seven-day waiting period for disabilities resulting from sickness, since most individuals are able to self insure for at least one week and the resulting saving in premiums is substantial.

In recent years there has been a growing tendency to issue additional benefits by means of riders attached to the basic loss-of-time policy. These benefits may also be added to group disability policies. The additional benefits riders are:

1. Hospital benefit rider; specifies a specific amount payable for each day of hospital confinement—$5, $8, $10, $12 or $14 per day.
2. Hospital services rider; pays for such services as operating room, anesthesia, laboratory and x-ray studies, transfusions, oxygen tent, iron lung, ambulance, drugs and dressings. This benefit is usually based on five, ten or even twenty times the daily hospital rate.
3. Surgical benefit rider; provides for payment of the amount specified in a schedule of operations. As in the case of the Blue Shield, there are different schedules in use in different sections of the country. Schedules of $175, $200 and $300 are those most frequently used.
4. Physicians'-fee rider; pays a specified amount for office calls, house calls and hospital calls. The most commonly used schedules for this rider are the $3-3-4 and the $4-4-5—either $3 or $4 for office and hospital calls and $4 or $5 for house calls. Payment begins with the first call if hospital-confined, and with the fourth call during a period of continuous total disability if not hospital confined. Several companies have repeatedly tried to write blanket medical coverage but have concluded it just cannot be done. There must be some co-insurance and also a ceiling on any one disability.

Finally a few additional remarks concerning group disability insurance. It is a plan whereby the employees of a firm (with their wives and children) may be insured for various benefits as a group under one contract. By issuing insurance in bulk it is possible to insure employees at a low net cost, and also extend the benefits of insurance to many who, because of age, physical condition, occupation or cost would not be able to secure individual policies. The insurance is provided under a contract between the employer and the insurance company. Employees obtain certificates of insurance as evidence of inclusion under the plan.

The premium may be paid partly by the employer and partly by the employees, or the total cost may be paid by the employer. Participation is not compulsory for the employees but participation of at least 75 per cent of the employees is usually required in order to prevent adverse selection against the insurance carrier. The impaired risks are anxious to participate, the healthy employees usually require some urging.

When management pays the entire cost, participation is 100 per cent. In this situation the loss ratio is frequently low and the insurance carrier is able to add additional benefits without increasing the premium, or to make substantial refunds of excess premiums. However, when the employer grants disability coverage as a fringe benefit in lieu of increased wages, the employee seems to feel that in order to profit from this sort of pay raise he must collect on his disability insurance. It is also a frequent experience that the higher the employee contribution to the premium, the higher will be the loss ratio.

Group disability insurance terminates with termination of employment, *i.e.*,

an individual is protected as long as he is actively employed by a company whose employees are covered by group disability insurance.

This concludes a very brief and sketchy outline of disability insurance, together with mention of the additional benefits that may be added by riders. Today approximately 13.5 million people are protected against loss of income by individual disability insurance, and 18 million by group disability coverage—4.3 million in civilian government service, 4 million by private industry providing paid sick-leave, 1.2 million by union-administered plans and 1 million by employee mutual-benefit associations. At the end of 1951 almost two thirds of America's breadwinners had provided themselves and their families with income, should injury or illness prevent them temporarily from working. This was an increase of 6 per cent over the 1950 total and it represents excellent progress in a rather new field of insurance. It also demonstrates the willingness and ability of private enterprise to rise to any occasion if given the opportunity to do so.

HOSPITALIZATION AND THE AGED*

C. L. REEDER, M.D.**

Continental Assurance Company, Chicago, Illinois

The most significant development in recent years between the public and the medical profession has been the demand by the public for means of prepaying medical care. This demand has been particularly strong in the hospital field. Americans, being insurance and installment conscious, find prepayment a natural way to meet the cost problems of sickness. This is especially true since the actual monetary cost of getting sick has increased, and since "going to the hospital" is now so readily accepted by the public.

Prepayment plans for illness and hospitalization have also been pushed by the medical profession for two basic reasons.

1. It is a natural way to help pay for an illness.
2. It will help keep the Government out of the sickness field.

There are two basic types of hospitalization insurance. Each has its proponents, yet both accomplish the same thing in a slightly different way. The two types are service plans and indemnity plans. The service plans are those usually offered by non-profit organizations such as Blue Cross and some others, all being mainly physician-sponsored. These plans usually offer full coverage in certain hospitals in multiple-bed rooms.

The indemnity plans are offered almost exclusively by insurance companies. They sell so much coverage for so much premium, both being directly related. Here an individual has his choice of the amount of coverage he wants, he collects

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the same amount from the insurance company whether he is in a ward or a private room, and he can collect it as long as the institution he is in is licensed by the state as a hospital.

If you will but stop to think that insurance is a method of prepaying dollars to collect future dollars in time of need, you will begin to understand why the insurance companies have offered indemnity-type contracts. They are the only contracts that are actuarially sound, because losses can be controlled. When a claim is filed, definite reserves can be set aside for the payment of that claim. With the service contract, this problem is much more difficult. Indemnity contracts rarely pay a bill completely, thereby creating necessary co-insurance; necessary, because it helps hold down expenses. It is no secret that plans offering full protection have higher and more frequent claims than plans offering partial protection.

A big disturbing factor, upsetting all apple carts, has been the rapid and continuous increase in hospitalization costs. These costs have been rising, and continue to rise about 1 per cent a month. This has made the service plans raise rates or reduce benefits, and the indemnity plans have had to offer more coverage at a higher premium.

Why have hospital costs soared? Obviously the biggest reason is the increased cost of labor and service. But secondarily there has been an increased tendency on the part of policyowners and physicians to use hospitals unnecessarily, and to order laboratory tests and expensive drugs in prodigious quantity. No one has ever quarrelled with something that is necessary, but the unnecessary is costly and probably wasteful.

I saw two files the other day which are typical of what some doctors are doing:

1. Hospitalization; 14 days at $9.00 per day	$126.00
Attending-doctor visits; 15 at $3.00 each	45.00
Laboratory and x-ray	76.00
Oral medication	14.00
Injections	434.50
	$695.50
Extras totaled $524.50	
Diagnosis: Gastroenteritis	
2. Hospitalization; 7 days at $9.00 per day	$63.00
Attending-doctor visits; 8 at $3.00 each	24.00
Laboratory and x-ray	19.00
Oral medication	7.00
Oxygen, injections, and Ilotycin	235.00
	$348.00
Extras totaled $261.00.	
Diagnosis: Virus pneumonitis.	

A third case, interesting in a different way, was one of cirrhosis of the liver with ascites. For a total of 4 aspirations the fee was $350.00, with a charge of $150 for the first drainage. The procedures were carried out in the doctor's office.

These examples are not typical but they occur often enough on a smaller scale, to send sky high the cost of getting sick. Some physicians have the idea that the plan or insurance company will pay the bill. Perhaps they have never realized that the premiums come proportionately from their own patients, and if the insurance is abused, the carriers have no alternative except to increase the premium for their coverages.

With these generalities past us, let's talk about the aged for a minute. They are important, for they are an integral part of our population; they are increasing rapidly, and they must be taken care of. Mr. John H. Miller, Vice President and Actuary of the Monarch Life Insurance Company, gave an excellent paper on this problem at the 25th Annual Meeting of the National Conference on Medical Service in Chicago, February 10, 1952 (*J. A. M. A.* **150:** 239 (Sept. 20) 1952).

The aged have always been difficult to insure. For life insurance, they die too quickly. For accident and health, they stay sick too long. They do not become sick much more often than the average, but when they do, their illnesses last much longer. This is a big factor to bear in mind when calculating hospital insurance rates. About 1942 someone got the happy idea that hospitalization coverage could be offered to individual old-age risks. This coverage has always been offered with the group hospital plans, but even here an undue proportion of elderly people in the group will affect the premium.

It was a progressive company that first issued an over-age policy. As soon as it was shown that the coverage could be offered without too much risk to the carrier, others were quick to follow. The coverages offered have changed little since the beginning. The ones with which I am familiar are of the indemnity type. They usually offer $10 per day for hospitalization, with total extras of five or ten times that amount. Most of the policies offer thirty days of hospitalization for any one illness at $10 per day, plus an additional thirty to ninety days at $5 per day. The coverage is offered to both men and women, employed or retired. The only hitch from the standpoint of the buyer is that general underwriting rules apply, *i.e.*, the applicant must be in good health, and have no pre-existing or chronic diseases. To date, our experience has been satisfactory. The loss ratios are higher than average, but still within insurable limits. The coverages offered are far from ideal but, for that matter, the people who are buying them are far from ideal insurance risks.

In closing I want to delve a little into the future. It is estimated that around 1975 about 20 per cent of total physician time will be devoted to caring for the aged. This presents a real opportunity to those studying the problem. The medical, social and economic factors are obvious to all of us. It is equally obvious that the job of medicine is to keep our old people well and useful as long as possible; possibly to the Utopia of death—well one minute, dead the next.

CEREBRAL HEMODYNAMICS AND METABOLISM IN SUBJECTS OVER 90 YEARS OF AGE*

JOSEPH F. FAZEKAS, M.D.**, JACK KLEH, M.D.† AND LLOYD WITKIN, M.S.‡

The Gallinger Municipal Hospital and the Home for Aged and Infirm, Washington, D. C.

Previous observations indicate that there is a decrease of both cerebral blood flow and oxygen utilization with age (1). Studies on subjects over 90 years of age, however, have not as yet been reported, and it was felt that worthwhile information regarding the effects of aging on the central nervous system might be obtained from such data. Our findings on 18 subjects between 90 and 102 years of age are presented in this report.

METHOD

Scheinberg and Stead's modification (2) of the Kety and Schmidt procedure (3) for the determination of cerebral blood flow (CBF) was applied in this study. The gas mixtures utilized were those described by Kety (4). Blood oxygen was determined by the manometric technique of Van Slyke and Neill (5). Mean arterial blood pressure (MAP) was obtained directly from the femoral artery by means of a damped aneroid manometer (6). The cerebral oxygen consumption ($CMRO_2$) and cerebral vascular resistance (CVR) were calculated as follows: $CMRO_2$ (cc. O_2/min./100 Gm. brain) $= \frac{CBF \times (A - V)\,O_2}{100}$, where $(A - V)O_2$ denotes arteriovenous oxygen difference. CVR (mm. Hg/cc. blood/min./100 Gm. brain $= \frac{MAP}{CBF}$.

RESULTS

Table 1 presents the results of 22 observations on 18 subjects between the ages of 90 and 102 years. For purposes of comparison, the mean values of previous findings on normal subjects less than, and over 50 years of age are also given. The mean values for cerebral blood flow and cerebral metabolic rate for the elderly subjects (90 to 102 years) were significantly lower ($P < .01$) than for normal subjects below 50 years of age but not significantly different from the values previously reported for normal subjects over 50 years of age (mean age, 68 years). The individual values varied considerably, and in several instances findings considered normal for the younger population (below 50 years of age)

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** Chief of Staff, Gallinger Municipal Hospital.

† Director, Medical Service, Home for Aged and Infirm.

‡ Research Fellow, National Institute of Mental Health.

were obtained. The mean value for the mean arterial pressure was within normal limits, although it was elevated in 6 instances.

TABLE 1

Cerebral Hemodynamics and Metabolism of Subjects over 90 Years of Age

Age	CBF*	CVR	$CMRO_2$	CVO_2	MAP	Comment
90	39.9	2.8	2.5	10.2	110	Senile
90	40.9	3.5	1.7	8.5	142	Alert
90	44.1	1.6	1.8	9.1	72	Senile
91	43.9	2.1	2.1	5.6	93	Senile
91	44.1	2.0	2.3	10.9	90	Alert
	36.1	2.6	2.2	9.2	95	
	42.4	2.1	2.6	8.4	90	
92	42.1	2.4	2.7	8.1	102	Alert
92	35.6	2.0	1.9	6.3	70	Alert
92	55.6	1.3	3.3	6.5	74	Senile
92	33.3	3.7	2.4	7.9	122	Senile
92	37.7	2.6	2.6	8.6	97	Alert
92	50.6	2.4	2.6	9.2	120	Senile
92	28.6	2.8	2.0	9.5	80	Senile
93	25.5	4.7	1.5	8.9	121	Semicomatose
	29.2	2.8	1.9	6.0	83	
96	46.0	2.2	2.4	4.0	101	Senile
98	40.8	3.0	3.0	6.9	123	Senile
99	38.5	2.8	2.6	7.7	109	Alert
101	33.9	4.1	1.6	9.8	140	Senile
102	20.7	4.4	1.5	6.3	92	Senile
	35.4	2.5	1.6	5.8	88	
Mean values						
93	39.3	2.7	2.3	7.8	102	
Mean values of subjects under 50 years						
34	54.2	2.1	3.5	8.3		
Mean values of subjects over 50 years						
68	42.5	2.9	2.4	7.8		

* CBF signifies cerebral blood flow in cc./min./100 Gm. of brain; CVR, cerebral vascular resistance in mm. Hg/cc. blood/min./100 Gm. of brain; $CMRO_2$, cerebral oxygen consumption in cc./min./100 Gm. of brain; CVO_2, cerebral venous oxygen content in cc. O_2/100 cc. of blood; MAP, mean arterial blood pressure in mm. of Hg.

DISCUSSION

These findings confirm previous observations of a reduced cerebral blood flow and metabolism in elderly persons. Since the subjects of this study were over 90 years of age, these observations may more accurately reflect the influences of

aging processes on the central nervous system. The reduced blood flow is undoubtedly due to the increased cerebral vascular resistance, suggesting the presence of some degree of cerebral arteriosclerosis. It is not possible to determine from these results whether the reduced cerebral metabolic rate is secondary to a vascular insufficiency or represents a primary cellular disturbance. There is no good correlation, however, between the rate of cerebral blood flow and cerebral metabolism in the individual cases, suggesting perhaps that the lowered cerebral metabolic rate may not be the result of a diminished oxygen delivery to the cerebral cells. The rather high oxygen content of the cerebral venous blood and the fact that for the most part the rate of cerebral blood flow was well above that shown to induce signs of cerebral ischemia in elderly subjects (7) also suggest that the lowered cerebral metabolic rate in these subjects may be due to a primary cellular disturbance. *In vitro* studies (8) on rats have disclosed a normal oxygen consumption for brain tissue up to approximately 2 years of age, after which it decreases. Since arteriosclerosis does not develop in this species, these changes in cerebral oxygen utilization are most likely due to a disturbance of some limiting enzymes or co-enzymes concerned with the oxidation of carbohydrate or with protein synthesis.

The present findings are not significantly different from those previously reported for a younger group of normal elderly subjects (mean age, 68 years). This would suggest that those factors responsible for the decrease in cerebral blood flow and cerebral metabolic rate proceed at an extremely slow rate in certain individuals. It is also apparent from these data that there is no correlation between the patient's mental status and the rate of cerebral blood flow and metabolism.

SUMMARY

The cerebral blood flow and metabolic rate of 18 subjects over 90 years of age were found to be significantly lower than in normal subjects less than 50 years of age, but not significantly different from values noted for normal subjects 50 to 91 years of age. There appeared to be no good correlation between the mental status of the subjects and the rate of cerebral blood flow or metabolism.

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A REALISTIC APPROACH TO REHABILITATION IN GERIATRICS*

S. G. FEUER, M.D.†

The Department of Physical Medicine and Rehabilitation, Jewish Sanitarium and Hospital for Chronic Diseases, Brooklyn, N. Y.

Medicine is now confronted by a problem of such magnitude that it has been described as "The number one problem of the internist and general practitioner" (1). The problem is that of a constantly increasing aging population, bringing with it an increase in chronic diseases and trauma of the aged and resultant disabilities. Numerous medical authorities and statisticians have reported in detail the increase in longevity (2), so that no repetition is necessary other than to point out that by 1980 it is estimated that more than one half of the population will be over 45 years of age and that definite changes will occur in the future practice of medicine. This increase in life span has been attributed to constant progress in the practice of medicine, scientific advances, improved standards of medical education and practices, reduction in maternal and infant deaths and improved public health procedures. Although the medical profession may be justifiably proud of these contributions to longevity, credit must be extended to the population for their constant efforts in improving the educational, social and economic phases of each successive generation.

Unfortunately, longevity, the fervent prayer and hope of the average normal human being and the goal of the medical profession, brings with it chronic diseases, trauma and resultant disabilities. These conditions are increasing in such proportions that the number of hospitals and institutions devoted to the practice of Geriatrics, in part or whole, is increasing steadily. Formerly, these diseases and disabilities of the aged, were accepted as inevitable and these unfortunate elderly patients were usually treated on a custodial basis until death occurred (3). This philosophy was based on the concept that the lack of specific remedies or cures permitted only symptomatic treatment in this large group of chronic degenerative and neuromuscular disorders. To a considerable extent this is still true, but with the acceptance of the modern concept of medical rehabilitation, it was soon realized that this program could and should be expanded to include the many disabled elderly patients (4).

Physical medical rehabilitation was pursued with courage and enthusiasm in many parts of this and other countries. Patients were evaluated and, provided that no serious contraindications existed, such as severe cardiac disorders or mental aberrations, were started on some phase of a rehabilitation program. The results were gratifying: many, who had spent years in the confines of institutions as total invalids, were able to go home; others were given some degree of semi-

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† Clinical Director, Physical Medicine and Rehabilitation.

independence, requiring less nursing or attendant care; others, although not able to achieve significant physical improvement, became more adequately adjusted to their disabilities and surroundings (5).

Unfortunately, as is the case with many new procedures and drugs, expectations have gone far beyond the range of practicability. Sometimes, too much was attempted or expected and often enthusiasm over-ruled good judgment and good common sense. In some instances, cases were selected for these programs that never should have been considered; in others, selectivity was on such an exclusive basis, that many that might have been improved were not started on such programs. It is only fair to state that this latter condition resulted from a shortage of trained technical and professional personnel and lack of facilities.

In any successful medical rehabilitation program for elderly patients with disabilities resulting from chronic diseases or trauma, five cardinal principles must be established (6):

1—That the patient, after proper evaluation, reveal definite possibilities of being assisted in achieving some improvement in range of motion and activities of living.

2—That there be an "acceptance" of such a program by the patient and family, with the realization that some physical limitations may persist.

3—That a definite line of demarcation be established early between those groups in the former categories and those in whom it is realized that a continuation of a rehabilitation program is justified for psychologic reasons only.

4—That the patient and the family understand clearly that the ultimate goal of these programs is to return the patient to his or her home environment, if at all possible.

5—That every serious consideration be given to improving the vocational status and economic lot of this constantly increasing group of disabled elderly patients.

Although the latter problem does not seem to be as important as the one presented by the disabled young adult with life's responsibilities and problems ahead, the aged person, with proper training and incentive can achieve some degree of economic security and financial independence if the element of competition is not a predominant factor. The concept of the "sheltered workshop" seems to be the answer to this problem, not only for the group of patients under consideration but also for the numerous younger patients who cannot compete with similar age groups because of serious permanent or progressive disabilities.

Medical rehabilitation represents the best illustration of team-work in medicine. The usual procedure is for the patient to be evaluated by a team consisting of the internist, neurologist, orthopedist, physiatrist, and other specialists as required. Then the physical, mental and all other defects, including activities of daily living and vocational abilities, are recorded, and if the patient is found acceptable for a medical rehabilitation program based on the principles enumerated, an individual program is outlined, with these goals to be achieved (7):

1—To treat existing disabilities.

2—To prevent further skeletal deformities.

3—To retrain the patient in as many activities of daily living as possible.

4—To retrain the patient in lost or impaired physical activities.

5—To retrain or teach the individual in some phase of vocational procedures within the range of his physical and mental abilities.

6—To bring about a psychologic adjustment to the disease and disability.

7—To aid the patient to return to his home, providing there are no interfering social and economic factors.

As stated previously, the results were found to warrant the procedures and extensive investments. A large percentage of the patients were able to go home; many were able to care for themselves to a greater degree and others were better adjusted to their disabilities and surroundings. However, rehabilitation was attempted in many instances in which realism would have been far more expedient than some of the considerations that did motivate programs in these patients. Not all, but only a few of these elderly patients with traumatic or chronic neuromuscular disabilities will be able to achieve some or all of the aforementioned goals. In many cases, it is of greater importance to be concerned with the general health and life span of these patients than with the amount of recovery of function of disabled extremities. This philosophy, coming from a physiatrist, will probably startle many of my colleagues. It is not based on mere opinions, but rather on several years of observations amongst hundreds of aged patients. It is usually not a difficult matter to convince the family physician that a patient cannot be accepted for a rehabilitation program; more often the difficulties arise with the family, whose concept of "rehabilitation" is based on the achievement of ambulation or other physical activity. I am definitely convinced that the problem of residual deformity, especially in an arm of a hemiplegic, or the recurrence of fractures resulting from falls in patients with unstable gait (as in Parkinson's disease and numerous comparable categories) should be approached with stark realism. The patient, if possible, and certainly the family should be taken into our complete confidence early, and the limitations and expectations clearly and simply outlined, so that no false hopes may be aroused which will eventually detract from the value of physical medical rehabilitation in the minds of the laity and many physicians.

Examples of such realistic approaches are the following 3 cases:

1—E. K., a 76-year-old woman with a right hemiplegia was referred for treatment of the upper extremity; her cerebral accident had occurred three years previously. She had received an adequate course of ambulation training and had been fitted with a short leg brace and a T strap. The patient and the family were now seeking the same results in the upper extremity. Upon evaluation, it was found that not only was there complete absence of motor power, but because of the relaxation of the muscles, a chronic subluxation of the head of the humerus had resulted. Certainly, no physical or orthopedic procedures were indicated and this was a case in which a patient had to be taught to adjust herself to her disability and utilize her remaining abilities. After careful explana-

tion to the patient and to the family, the only procedure recommended was a supportive sling.

2—Another case illustration is that of an 80-year-old female, L. H., with a fracture of the left hip resulting from a fall. She was well preserved for her age and made an uneventful recovery following nailing of the hip. A therapist had helped to preserve muscle tone and a good range of hip motion, but the family and the patient desired that she walk again. Upon consideration of this case it was soon ascertained that she had experienced no less than 16 falls during the previous year, resulting from an unstable gait due to Parkinson's disease. In this instance, the family had to be reconciled to a quiet existence for the patient, with ambulation to be considered only with constant supervision and human assistance. It was pointed out to the family that because of her keen mental faculties there were many avenues available to this patient for an enjoyment of life and that unassisted ambulation might result in death, directly or indirectly.

These cases clearly illustrate that it is not always feasible to pursue a program of physical activity; in others, a very limited program may have to be instituted until the patients become psychologically adjusted and shift to their remaining assets, both physical and mental (6).

3—On the other hand, as a definite example of valuable assistance to the patient, is the case of A. K., a 76-year-old female who had been confined to a chronic disease institution for three years as a custodial patient. Because she was well preserved and had the desire and will to help herself, she was considered a good case for rehabilitation. After six weeks of physical procedures, including the correction of some deformities that had resulted, she was started on a program of crutch ambulation and balance and shortly thereafter was fitted with a prosthetic device which she learned to handle very well; four months after the program was begun she was discharged from the hospital. She was able to manage by herself a two and one-half room apartment for almost four years, before succumbing to an acute coronary occlusion.

CONCLUSIONS

Physical medical rehabilitation has added to acceptable methods of treatment in elderly people. There are definite criteria and limitations which must be recognized early and each case must be treated on an individual basis with extreme caution, common sense and realism. No program of rehabilitation should be pursued in which the slightest danger to life or further injury is more than a remote possibility. Physical medical rehabilitation has and will continue to be of extreme value in the practice of geriatrics but, like any other therapeutic agent, is not a panacea.

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PATHOLOGY OF SPONTANEOUS MYXEDEMA IN THE AGED*

PAUL A. BASTENIE, M.D.†

University of Brussels, Belgium

Although hypothyroidism may be encountered at any age, spontaneous myxedema is mainly a disease of the aged. The vast majority of cases are caused by atrophy of the thyroid. In some instances the process is due to pituitary deficiency, but mostly the nature of the atrophy is still undetermined.

This lack of information may be due to the limited number of autopsy reports. During the last twenty years we have had the opportunity to study the morbid pathology of 29 cases of severe hypothyroidism which had received little or no treatment.

In 22 cases (patients aged from 58 to 84 years) the cause of myxedema was primary thyroid atrophy, and in 7 cases the primary lesion was found in the pituitary; the age of these patients at the time of their death ranged from 50 to 72 years.

I. Pathology of primary hypothyroidism (myxedema)

In our series of 22 autopsies on cases of primary hypothyroidism, the *thyroid* was atrophic in all instances, the weight varying from 15 to 3.5 Gm. On microscopic examination (1, 2), the parenchyma was usually reduced to remnants of cells, enclosed in dense inflammatory tissue. Occasionally some alveolar structures could still be recognized. More often the cells were disposed in irregular heaps. They showed marked degenerative stigmata: cloudy swelling of the cytoplasm (which had become very eosinophilic and fuchsinophilic) and pyknotic retraction or monstruous swelling of the nuclei.

In some cases, limited areas of nearly normal tissue could be found. Here it was apparent that the epithelial cell degeneration preceded all mesenchymatous inflammatory reaction.

In 6 cases another kind of cell could be found, forming small nodules resembling either parathyroid or epidermoid tissue. Such tissue has occasionally been found in the normal thyroid gland (3) but has more often been seen in chronic thyroiditis (1, 4). In Wegelin's opinion (5), this tissue is derived from the thyreoglossal tract.

The characteristic features of primary thyroid atrophy seem to be: primary cell degeneration, secondary nonspecific inflammatory reaction, fibrous tissue proliferation, and development of cells derived from the thyreoglossal tract. The analogy of this process with that occurring in liver cirrhosis is obvious. For convenience and clearness the term "atrophic thyroidosis" might be used (2).

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† Professor of Clinical Medicine. Mailing address: Clinique médicale, Hospital Brugmann, Brussels, Belgium.

The *pituitary* was studied in 13 of the cases. Some degree of atrophy was found in 2 instances. On the other hand, a definite increase in size and weight (up to 1.25 Gm.) was found in 10 cases. The chief microscopic features were: a decrease in the number of the eosinophilic cells and the presence of large chromophobe or faintly basophilic, vacuolized cells. These cells have been described by Wegelin (5) and by Berblinger (6) in other hypothyroid conditions, have been found in many species after thyroidectomy (see refs. in (7)), and have recently been observed in the frog when the thyroid of this animal is showing spontaneous activation (8).

The *adrenals* showed gross atrophy in only 2 cases. On the contrary, in 12 cases there was a macroscopic increase in size, and an increase in the fat load of the cortex; adenomatous structures were often found.

Among the other pathologic findings, the most noteworthy were marked generalized atherosclerosis, enlargement of the heart (mean weight, 400 Gm.) and enlargement of the colon.

II. Pathology of secondary hypothyroidism (pituitary myxedema)

The 7 cases of pituitary myxedema which came to autopsy had been diagnosed as common hypothyroidism. Although all these patients were women, in only 1 could Sheehan's syndrome be suspected. In the other 6, the first symptoms occurred after the age of the menopause.

In all, the *pituitary* showed the severe destructive lesions (cysts or nonspecific chronic inflammation) well described by many authors (see refs. in (9) and (10)).

The *thyroid* was moderately reduced in weight and its microscopic picture was quite different from that seen in primary hypothyroidism. Inflammatory exudation was either absent or very slight, and there was no parenchymatous degeneration; instead there was marked colloid involution, indicating a resting state of the thyroid parenchyma, comparable to that observed in the hypophysectomized animal.

The *adrenals* in these cases were small and poor in lipoids.

Among the other features, splanchnomicria was noticeable, especially with regard to the size of the heart (mean weight, 260 Gm.)

Primary versus secondary hypothyroidism

The findings encountered in primary and in secondary hypothyroidism are summarized in Table 1, which may be of some help in the understanding of the differences in the physiology and therapy of the two conditions.

III. Pathology of preclinical stages of atrophic thyroidosis

Many authors have stressed the insidious onset of myxedema and its slow progress when untreated. Most of our patients, prior to hospital admission, had either not been treated, or had had very inadequate treatment. In 20 of the 22 cases, the age at the time of death was beyond 60 years. This observation suggested that methodical study of the thyroids of patients dying from miscellaneous diseases might occasionally disclose initial preclinical stages of the process which leads to complete thyroid atrophy.

Such lesions have been found in 100 *thyroid* glands, collected from fresh autopsy material (Fig. 1). Parenchymatous eosinophilic degeneration, lympho-

TABLE 1

Pathology of Myxedema

Tissue	In primary hypothyroidism (thyroid)	In secondary hypothyroidism (pituitary)
Thyroid	Atrophic thyroidosis	Colloid involution
Pituitary (ant. lobe)	Hyperplasia; "thyroidectomy cells"	Destruction; cyst; adenoma; chron. inflamm.
Adrenal cortex	Hyperplasia; increase in lipoids	Hypoplasia; decrease in lipoids
Other tissues	Cardiac hypertrophy (400 Gm.); megacolon	Splanchnomicria; (heart, 260 Gm.)

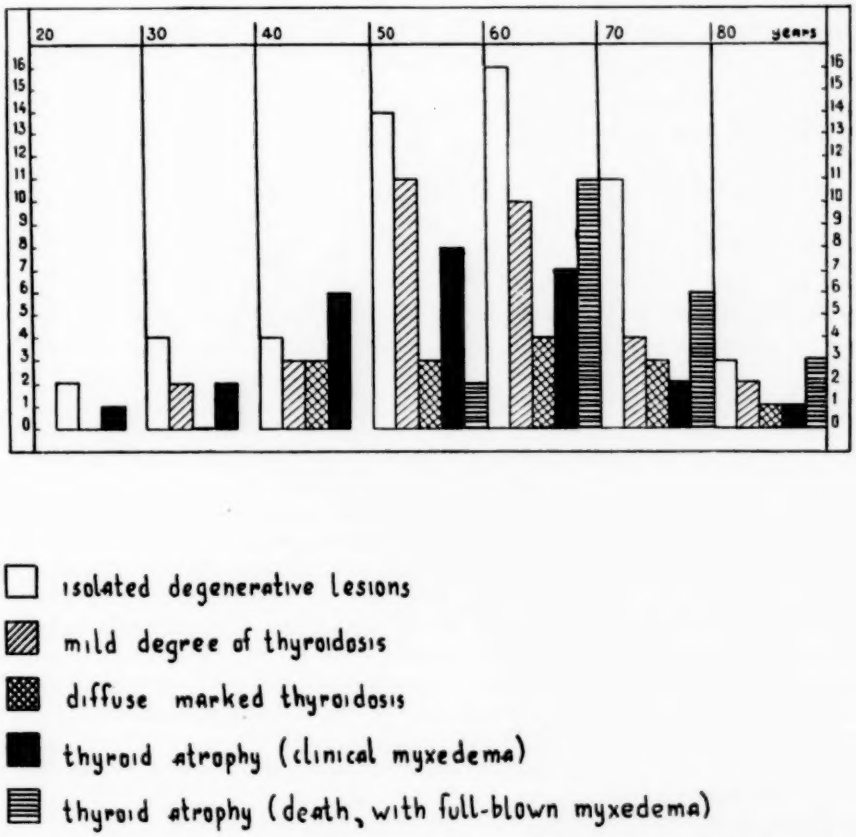

FIG. 1. Age distribution of atrophic thyroidosis (100 cases) and clinical myxedema (29 cases). Age at time of death in full-blown myxedema (22 cases).

cytic and plasma-cell exudation, epidermoid-cell proliferation and fibrosis were encountered, in degrees varying from isolated spots to diffuse "thyroidosis." Compared with the picture in cases of clinical myxedema the only difference was the presence of some normal or hyperplastic thyroid tissue (2).

The *adrenals* in most of these cases were hyperplastic, and often adenomatous.

In the *pituitary*, the characteristic "thyroidectomy-cells" were found whenever atrophic thyroidosis was marked.

COMMENT

These observations show that clinical myxedema is the end-result of a slowly progressive destructive process. Quite different from simple atrophy, this process is similar to that of liver cirrhosis. It is most frequently observed between the ages of 50 and 80 years.

The findings suggest that pituitary reactions play an important part, not only in the compensation for the thyroid atrophy but also in the progress of the thyroid degeneration. It seems probable that each additional amount of destruction of the thyroid parenchyma is the source of further pituitary stimulation, which, in its turn, brings about renewed thyroid hyperactivity—but also exhaustion and degeneration.

Although this explanation admittedly remains conjectural, it seems in keeping with work on circulating thyroid hormone (11) and with the results of assays for thyrotropic hormone in the blood and urine of myxedematous patients (see refs. in (12), (13) and (14)).

SUMMARY

Autopsy findings are reported in 29 cases of myxedema observed in aged patients. In 7 cases the hypothyroidism was due to a primary destructive lesion of the pituitary gland. In 22 cases the hypothyroidism was related to an atrophic cirrhosis of the thyroid, the preclinical stages of which have been investigated.

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HEALTH AND HAPPINESS AFTER SIXTY*

MALFORD W. THEWLIS, M.D.†

Thewlis Clinic, Wakefield, R. I.

Everyone would like to live to a ripe old age, except the few who are too rigid to enjoy life. Almost everyone has a personal life-extension program.

So-called "secrets" of longevity

The Greek philosopher who thought that compensating body heat loss would preserve youth, built a house on a dung hill. Some of our elderly contemporaries try to accomplish the same feat by keeping their houses at 85°F. during the winter months, and never airing the rooms. Perhaps these efforts are poor substitutes for thyroid, for testosterone or those magic "shots" patients seem to demand.

We all know persons who have found the secret of long life: alcohol, special diets, colonic washings, health foods, honey from Cuban bees, weird exercises, or chewing tobacco.

Ancients drank the blood of dying gladiators to acquire valor. Moderns drink alcohol with the same end in view. It makes one popular to say that a daily highball dilates the coronary arteries. Since I do not smoke I may not need to offset vasoconstriction. Since I do not drink alcohol I must depend upon exercise to dilate my vessels. It may be that our goal is easier to reach through omissions which, incidentally, make life less complicated but not nearly so pleasant.

No doubt alcohol and tobacco have a bad effect on some people. So do water and eggs at times. Anything may be detrimental. Time and time again I have seen serious illness imitated by an allergy to simple foods such as cow's milk. Some people are disturbed by salt; some by bread. So the staff of life to some, may be poison to others. Too much of any one thing is likely to be harmful as one gets older. That also applies to prosperity: it can do a lot of harm to some people. One may be harmed by worries, the cause of which may be insignificant, like a buzzing fly; another may fall down an elevator shaft and be unharmed. Some one placed a sign on a church in Springfield, Massachusetts saying, "Life is what you make it; it all depends upon the liver." A local newspaper noted that the physician near by was flooded with requests for "liver medicine."

An old man came to me suffering from pruritus ani. He was given x-ray treatment; he noted improvement but thought this was due to a vegetable which a friend brought to him, said to contain a special element—endive. So that became the curative symbol.

Several years ago I spoke before a medical group, noting that excessive cholesterol in the diet might cause arteriosclerosis. Some physician from Norway,

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† Director

Maine, discussed the article; he pointed out that one of his old patients ate sixteen eggs every day for breakfast yet showed no evidence of arterial change.

It is said that poor nutrition causes bad teeth. Yet I have observed in certain areas in the town where I practice, that the colored population, which in the recent past lived on a poor diet, have beautiful teeth. Some families consume more than their quota of vitamin capsules, yet seem to be ailing. In these cases it must be what their grandparents ate that made the difference. Maybe the soil in those days was not so stripped of its value as it is today. One often sees a farmer getting three crops of vegetables in a summer without adequately replacing the fertilizer. It may be that my friend, Robert T. Morris, was right when he said that the top soil was exhausted; that the next step in better nutrition was towards subsoil. He grew all kinds of nuts on his farm, obtained from deep-rooted trees. He used the subsoil. There may be some validity in the claims of the "natural compost" enthusiasts, who object to so many chemicals added to soil. Although I am not an advocate of organic soil, I can see some sense in normalcy on earth.

Heredity and environment

It may be said that "Life is what grandfather made it." A good germ plasm is essential to sound health. If one inherits weak legs, a weak heart, a weak stomach, or a weak head, he is bound for trouble unless he gives himself special care.

Heredity plays an important part in our future health and happiness. I see the clinical value of knowing family backgrounds; I practice in a community which my uncles and I have covered over seventy-five years. The experience has given me an insight into preclinical medicine, *i.e.*, preventive geriatrics—an attempt to work on the soil of disease during the conditioning period. If one gives special attention to family weaknesses, such as weak stomachs, when a man is between 20 and 40 years of age, he may be spared much trouble after he is 50. That is the geriatric period—from 40 on. Yet some people are old at 20; some are young at 80. It depends in great part on what the hereditary factors are.

Environment is also an important factor. When one knows which hereditary conditions are abnormal, environmental changes can help to correct the deleterious factors. For example, a person with a tendency to peptic ulcer, should benefit from a peaceful home life and a soothing environment. A person subject to migraine should have calm surroundings, free from confusion, to help ward off an attack.

A background of nervous instability may affect the patient in many ways. As a rule this type of person must be handled carefully. Kindness is important.

Work and exercise

In general, older people go to pieces when they stop working. Naturally some people are physically handicapped and are not able to do any manual labor. Some who have had minor strokes are not able to concentrate enough to do anything worth while. However, many are unnecessarily shelved after a certain age. It is at the age of 50 that most people reach full maturity and have judicial

minds. Maturity comes at the age of 30–40 but the judicial level is seldom reached before 50.

At this age a man is at his best. His education and experience have blended; he has struck a sober level; his judgment is at its best. We need older men to teach and train younger men. Young men should work side by side with their elders. That is how common sense is developed in younger men. Years of experience that have given older men this rare thing, common sense, cannot be taught in school.

Purposeful work is one of the best weapons with which to keep young. There is too much attention paid to ping pong and other games to lull the minds of the aged. It would be far better to occupy their minds with stimulating conversation rather than to deaden their brains with purposeless talk.

There is no reason why older people shouldn't take extension courses in universities, or attend lectures on philosophy, art, sculpture and ceramics. One has only to visit the Wm. I. Sirovich Day Center in New York to see how much can be accomplished along these lines; here about 700 older people take advantage of the excellent work Harry Levine and Miss Frances King are doing. Recently they had a fashion show in which several old ladies were models for clothes and hats they had designed. They have a glee club, orchestra, dramatic club and art department. Some of the paintings by older people who had never painted before seemed remarkable to me. They look forward each day to the pleasant atmosphere of the center. They are always on the go; the dances alone give them exercise. These old people are happy. They are seldom ill. Not one has been committed to an institution since going to the center, so mental illness seems to be ruled out. They are too full of constructive thoughts to allow themselves to be ill.

Older people in industry

Many older people do well in industry. I can think now of a 73-year old man who heads a machine shop of 40 workers making precision instruments. He has held this position for a long time, but now there is a substitute being trained to make work easier for him. I have known this man for over 50 years; he is efficient and he looks as young and is as cheerful as he was in his youth. He has been married to the same wife for 50 years. She has been in a mental hospital on six occasions; yet she is now well and for four years has been apparently cured. Probably one of the reasons she is well is because her husband is kind and thoughtful. This is old age at its best. The husband works every day; the wife takes care of the house. The children live nearby and visit their parents regularly. The old people have a garden, and spring and summer find them working on vegetables and flowers. They have friends in the neighborhood and enjoy life in general.

This is one man who was not shelved at 65. He gets along well with other workers, and his efficiency and health records are good. He has an even disposition (which makes for easy relationship with the owner of the plant) and does not display the rigidity of age, but rather the flexibility of youth. In other words, he is still young enough to hold an important job.

Besides these human qualities this man's mind is as active as it was in past years. He has contributed fifteen patents to his organization—new inventions and improvements on micrometers, the only instruments his company makes. Now a life spent on improving micrometers is a good example of concentration. Add to this a job in which human relations are at their best with his owner and co-workers, and we find an excellent combination.

SUMMARY

There are many "short cuts" to longevity, varying from such things as smoking and excessive alcohol, to nuts.

A good hereditary background is one of the most important factors in good health and long life.

Purposeful work is one of the most important things required for a happy old age. Retirement in industry is detrimental to the health and well-being of the aged.

BREAST DISEASE IN OLDER PATIENTS*

LOUIS P. RIVER, M.D., JOSEPH SILVERSTEIN, M.D. AND JOHN W. TOPE, M.D.†

The Departments of Surgery, Cook County Hospital and Stritch School of Medicine, Loyola University, Chicago, Illinois

Although there is considerable information in the literature about the distribution of cancer by decades, little has been written about the proportion of cancer to benign disease of the breast occurring at comparable ages. Most women who consult their physicians for symptoms referable to the breasts are less than 50 years of age; but at least half the cases of cancer occur in the smaller older group of patients. Dawson (1) observed that cancer was seven times as common as benign disease in the breasts of women over 50; whereas before 40, exactly the reverse situation obtained. He noted that the "period of reversal" between 40 and 50 corresponded roughly to that of the menopause. Dargent and Mayer (2), arbitrarily assuming age 50 to be the time of the menopause, remarked that 60 per cent of 1,344 cancers had their clinical onset in postmenopausal women.

McKinnon (3) considers that neither increase in the standardized and the age-specific rates nor the breast total ratio, as cited particularly by Willis (4), provides any sound evidence of an increase in breast cancer apart from that redistribution of cases due to aging of the population. Almost all studies of the last decade mention an average age of over 50 years for patients with breast cancer.

Concepts of the age incidence in breast cancer derive almost entirely from the study of hospitalized patients and are difficult to relate directly to the general population. There has been shown to be a gradually increasing susceptibility to breast cancer with advancing age. Observations on the age distribution indicate that three fourths of all patients are in the fifth, sixth and seventh decades (5, 6, 7, 8). A peak of incidence occurs between 46 and 48 but there is a second and lower peak between 59 and 63 years of age (6, 9, 10). In 2,165 cases, Nathanson and Welch (6) found a peak incidence at the time of onset between 46 and 48 years. This incidence, however, applies only to patients seen in hospitals and does not apply to the community as a whole. These authors comment: "Either the age distribution of cancer of the breast in a hospital must be compared with the age distribution of all patients in a general hospital, or cancer of the breast in the general population must be compared with the age distribution of the general population. It is only in such a way that correction can be made for the relative infrequency of older patients in a hospital." But the statistical fallacy goes further; it fails to observe comparisons with dispensary patients, such as our series represents.

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† Senior Surgical Resident and Solomon Foundation Fellow, Cook County Hospital.

CLINICAL DATA

The average age of all those with cancer in our series was 55 at the time of the first examination. In order to exclude those who were less than 50 at the time of onset, and to exclude as many as possible of those who were still menstruating at the time of clinical onset, this discussion is based on the records of those patients who were 55 or over at the time of first examination. In a series of 1,106 patients consecutively admitted to our clinic because of presenting symptoms referable to the breasts, 1,000 submitted to biopsy or were followed in the clinic for at least one year. Seventy-five per cent were Negro; the remainder, with the exception of 2 Orientals, were white. The youngest was 7 and the oldest 85; 40 per cent were over 40 years of age. There were 154 patients aged 55 or older at the time of first examination; 60 per cent of these were Negro. The oldest of this group was 85 and the average age was 64.6 years. The average age of those who had cancer was 66.5 years; of those with benign disease, 62 years. Of the 17 men in the older group, 2 were found to have cancer recurrent after mastectomy; the remainder had benign gynecomastia. Eighteen women had been operated on elsewhere for breast cancer. There were thus 117 women patients, of whom 89 had primary cancer. The accompanying table shows the percentile distribution (11) of cancer by decades among the entire group.

Of the 154 patients between the ages of 55 and 85, 127 sought treatment because they had found lumps in the breast and, of these, 35 described some sort of associated pain. Other presenting symptoms were pain, 8; bloody nipple discharge, 6; bloody nipple discharge and lump, 3; previous mastectomy, 5; rash, 4; and "no complaint, referred from another clinic," 1.

Among the patients who complained of lump, 77 had cancer, and recurrent cancer was found in the 15 postmastectomy patients who entered with this presenting symptom. Thus approximately 3 out of 4 patients (72.44 per cent) over 55 years of age who complained of lump were found to have cancer, whereas among our patients between 20 and 55 with the complaint of lump, only 1 in 4 (24.10 per cent) had malignant disease. Among the remainder of those with the complaint of lump there were 15 who had gynecomastia; 4, periductal mastitis; 5, lipoma; 8, adenosis (fibrocystic disease); 1, leukemic infiltration of breast tissue; and 1 who was found to have no demonstrable breast disease.

Eight patients complained of pain alone. Seven of these were found to have lumps, and in 4 the lumps were found to be advanced cancer. Three patients, all in their sixties, had adenosis, and 1 with the symptom of pain alone was found not to have any disease of the breasts.

Lumps were palpable in the breasts of 2 of those who reported bleeding of the nipple. One of these lumps was carcinomatous, and 1 was a benign intraductal papilloma. Four other patients had intraductal papillomatosis. All 3 of those with complaints both of bleeding from the nipple and of lump were discovered to have carcinoma with axillary metastases. All 4 of the patients with rash or eczema of the nipple had palpable lumps which were breast cancers, 2 of them without demonstrable axillary metastases.

Whenever true or dominant lump, nipple discharge containing blood cells, or persistent eczema or ulceration of the nipple were found, surgical biopsy was performed. Inflammatory lesions, most of the simple gynecomastias, and some recurrent cancers were not subjected to biopsy. In all, there were 93 biopsies. A surprising feature of the histories of the women with cancer was the finding concerning parity: 22 had been childless; 48 had had from one to three children; 11 had had four to six, and 12 had had seven or more children. In 16 instances the information was not recorded.

Many of these charity patients were suffering from nutritional deficiencies common to patients in our clinic paractice. Forty-four had vascular hypertension or arteriosclerotic changes or both; 17 had heart disease of varying severity and 2 were in a state of mild decompensation when first seen; 6 had controlled diabetes mellitus; and 5 patients with breast cancer had cancers of other organs—1 each of thyroid, prostate and rectum, and 2 of the cervix. Pulmonary tuberculosis, cirrhosis of the liver, leukemia, severe secondary anemia, and tertiary syphilis were each found in a single instance.

TABLE 1

*Percentile Distribution of Primary Cancer by Decades among 154 Patients with Breast Symptoms, Aged 55–85**

Age (yrs.)	No. patients	Benign	Cancer	Percentage with cancer
55–64	80	29	51	64
65–74	48	13	35	72
75–85	26	3	23	88

* Jones (11) found the average age of 62 patients with benign disease to be 41 years; whereas, among malignant cases the average age was 52.9 years.

In the older group of patients with primary cancer, 40 had the disease apparently limited to one breast or to the breast and the axilla of the same side; 12 had proved remote metastases, and 37 were presumed to have incurable (metastatic) cancer because of the advanced stage of either the original tumor or of the axillary metastases. It may be noted that the percentage of cancers in clinical Groups I and II was much higher than for our series as a whole. There were 239 cancers among the 1,000 patients.

It may be only a coincidence that numerous writers (12, 13) have found no correlation between lymph node metastases and age. Taylor and Wallace (14) among others, however, have observed a greater proportion of higher grades of cancer in younger women. Their opinion is that metastasis takes place earlier, and operative field recurrence is increased over that in older patients with Grade III lesions.

If we do not count the secondary cancers in our series, there were 109 cancers occurring after the age of 55 (Table 1) as compared with a total of 239 of all ages—slightly less than the 50 per cent usually mentioned for hospital cases over 50 or 55.

If male cancers and secondary cancers are excluded, 75 per cent of all lesions were cancerous and 25 per cent were benign. Regarding the age group over 75, the percentage of cancer was almost 90 per cent. These, it should be borne in mind, were dispensary cases. The large number of cases of gynecomastia is apparently related to the poor nutrition and hepatic diseases prevalent among many of our patients. Periductal mastitis and adenosis were not clinically distinguishable with ease from early cancer lacking the classic signs. The diagnosis was made with certainty, however, by biopsy.

Five patients had lumps and nipple discharge, and 4 of these had cancer. All 4 who had nipple discharge without palpable lump, however, had benign disease. There is wide variation in the reported incidence of carcinoma in the breasts of patients with nipple discharge. The physician confronted with this problem should remember that this finding alone seldom leads to discovery of a cancer and that if a lump is found, biopsy of that lump is the only sure diagnostic procedure.

All the patients who had eczema or ulceration of the nipple in the older age group had Paget's disease; each had a lump. It is apparent, then, that an increased cancer incidence related to the presence of lump is matched by a similar increased incidence related to the presence of nipple discharge and nipple rash. In the younger group these symptoms were relatively insignificant in the discovery of cancer.

There were 15 patients with recurrence, either local or remote, following mastectomy performed elsewhere.

A total of 104 patients received the following treatment: radical mastectomy, 31; simple mastectomy, 28; roentgen therapy only, 3; and hormone therapy, 25. Nine patients who presumably had carcinoma with axillary metastases only, were treated by simple mastectomy because it was thought that other diseases present made five-year survival unlikely. Age itself in no case was accepted as a contraindication for extensive surgery.

Figures on the survival rates among these 1,000 patients are not available, since this series ran from September 1947 to December 1951. During essentially the same period, there was the opportunity to care for and observe another group of 100 patients who died in the hospital of breast cancer. Fifty-five of these patients were 55 years of age or older; 14 were colored and 41 white; the average duration of life from the time of the first symptom was thirty-six months. Twenty-one patients had had radical mastectomy; 7 simple mastectomy; 5 roentgen therapy only; 5 had been treated only with hormones; and 17 had had no treatment.

In Nohrman's series of 1,042 cases (15) there was a relative increase in inoperable cases found with rising age. Hartford Hospital and Presbyterian (N. Y.) Hospital figures (16) lend support to the conclusions of Haagensen and Stout (17) that radical mastectomies are often worth while, even in patients over 70 years of age.

Concomitant disease, such as cardiovascular disorders to which older patients are increasingly susceptible with increasing age, are not a contraindication to

surgery. In our series there was no hospital mortality despite the high incidence of cardiovascular diseases. Blood transfusions were used rather liberally in this group of patients.

Although some observers (3, 18) have found no apparent relation between age at onset and survival, most writers have indicated an increasing expectation of life with an increasingly later age of onset. A slightly better prognosis with older age has been observed by Wade (19), Taylor (20), Taylor and Wallace (14), Sanders and Pool (13), and Wells (16). Cade (21) believes there is some evidence that in the very old (over 75) the disease does not materially shorten life. Sanders and Pool (13) found a survival advantage of 16 per cent in patients over 40 years of age without metastases, although there was only a 3 per cent difference in two groups with metastases. Ages ranged in these 206 cases from 26 to 85, with 152 patients between the ages of 40 and 65.

Meyer, Dockerty and Harrington (22) noted the age incidences in their studies of results in roentgen therapy, but saw no connection between age and response to irradiation.

EXAMINATION

Examination of older patients with breast symptoms is accomplished in the same manner as examination of younger patients. The routine of examination has been best described by Haagensen (23) and is well detailed in two recent moving pictures produced by the American Cancer Society. Some salient features of differential diagnosis and technique of examination warrant renewed emphasis:

Palpation should be gentle and thorough, with recollection of the known possible extent of breast tissue as high as the clavicle, to the midline, down onto the rectus fascia and as far laterally as the anterior border of the latissimus dorsi muscle. In many women the axillary extension of the upper outer quadrant reaches around the free border of the pectoralis major and well up into the axilla. During the procedure the patient is instructed in examination of her breasts, to be self-performed monthly. Some lumps beneath the areola or deep in obese breasts may best be felt with the breast between the fingers instead of under the fingers; in general, palpation is best accomplished with the patient supine. Usually one breast may be spread most evenly upon the chest wall by placing a small pillow under the corresponding shoulder. The routine of palpation may progress either circumferentially or segmentally, feeling with the flats of the adducted fingers.

One or more quadrants of the breasts may be the sites of granularities or nodularities. The commonest sites for such changes in texture are the upper outer quadrants, less often the inferior hemispheres. Occasionally these changes may be diffusely spread throughout the breasts; and they may be found unilaterally. Thickenings without granularity or nodularity may be found as localized areas of increased density. Occasionally swelling may involve one lobule, in which case the outline of the swelling may be suggestive of its nature. This type of swelling, when it is due to a blocked duct, may have a doughy feel. If premenstrual pain or tenderness is described by the patient, it will usually be located in areas of increased density or granularity.

Palpation of the nipple and areola is next in order. The nipple itself is gently compressed between the fingers, and the location of the duct or ducts from which discharge may be expressed is noted. If the symptom has been nipple discharge, but nothing can be expressed from the terminal ducts, compression is applied circumferentially at increasing distances from the nipple. Pressure upon a single spot with one fingertip will often cause material to issue from one duct. The location of this spot and of the involved duct is recorded. The comparative elasticity of the nipples is observed. In some women who have had long continued low-grade inflammation in the terminal ducts, a firm, cordlike mass may be felt centrally, which also restricts the distance the nipple may be stretched.

Palpation of the axillae may be carried out with the patient either sitting or supine; the arm and shoulder must be relaxed, palpation gentle and thorough, and performed with recollection of the locations of lymphatic chains.

It is merely necessary to mention that adequate use of inspection may disclose signs of carcinoma in the opposite breast, the axillae, the supraclavicular spaces, or the bulge of a liver laden with carcinoma.

Three clinically significant diagnostic symptoms

We have found three symptoms significant in making a clinical diagnosis of cancer in 97 per cent of our cases. These were "*lump*" (including painful or tender lump), *discharge from the nipple* (including bloody discharge), and "rash" or *eczema* of the nipple.

Dominant lump.—The most important feature of the examination is the diagnosis of a dominant lump. Dominant breast lump is one that differs from anything else felt in the breasts in size, in consistency, and in physical differentiation from surrounding breast tissue, or in any combination of these characters. In the breasts of patients over 55 there is less likelihood of confusion with the lumpiness characteristic of fibrocystic mastopathy which disappears after the menopause. Fibroadenomas are often anteriorly extruded; nevertheless, a fibroadenoma may not feel so close to the examining fingers as does a small carcinoma enclosed by breast tissue, which has infiltrated Cooper's ligaments even minimally; and it is seldom that other tumors demonstrate "poppability," the tendency of adenomas to slip out from under the fingers. A cyst may be less movable, more elastic and less well differentiated from surrounding tissue. A small, hard carcinoma in an atrophic breast may simulate fibroadenoma in mobility but seldom in the circumscription of its margins, if breast and tumor are palpated against the chest wall. Cysts may conceal carcinomas, and some carcinomas, such as the mucus-producing adenomatous type, may be softer in consistency than cysts.

We have previously discussed (24) the extent of clinical error in the determination of the nature of dominant lumps. We are still sure that there is no justification for relying on clinical judgment exclusively. Surgical biopsy is just as important in diagnosis when there is a 90 per cent chance that the tumor is malignant as when there is an equal or greater possibility that it is benign. To

perform a needless mastectomy is as inexcusable as to allow a cancerous lump to remain.

Nipple discharge.—In the absence of a lump but the finding of nipple discharge the two concerns are, 1) to determine the best procedure to follow so that an early curable carcinoma will not be overlooked, and 2) not to perform unnecessary mutilating surgery, from pure negligence.

Saphir (25) has reported that study of nipple discharge by the Papanicolaou technique and stain is subject to false positive and false negative results in numbers that make the method far less certain than biopsy. The danger of delay because of a negative smear is evident; but the advantage to be gained by use of the method may become apparent with further experience. If the leaking duct can be accurately located, a blunted needle may be passed into it under general anesthesia and the duct incised on the needle after the manner of Babcock; or the entire duct, visualized because of the color of the contained fluid, may be excised. We have been unable on occasion to find in the surgical specimen at the time of examination in the pathology laboratory, tiny papillomas seen on first opening the duct; therefore, we now immediately tag papillomas discovered during the operation with a black silk stitch.

In women past the menopause, who had no dominant lumps and in whom we could not locate one leaking duct or could not cannulate a duct if found, we did not hesitate to propose and carry out partial mastectomy, including the nipple, areola, and the subadjacent area containing terminal ducts. No instance of carcinoma was disclosed in patients so treated.

We have found that many of the patients to whom we do not propose immediate operation fail to return after the first visit, and those who do return are likely to become increasingly resistant to the idea of diagnosis by surgery. Not to be overlooked, therefore, is the method of discussion of the situation with the patient, so that she will not be lost to follow-up after the first examination.

Most carcinomas first manifested by nipple discharge are localized and potentially curable. In our opinion, there are better results from efforts to make diagnosis certain in such cases, than from attempts to increase the extent of surgical effort against later stages of the disease.

Eczema.—Patients with the complaint of rash of the nipple who have had eczema involving both nipples or one nipple and areola, without palpable lump, have not had carcinoma in our experience. We are highly suspicious, however, of a small lesion on the apex of the nipple. In the absence of a lump, it is permissible to temporize by two months' treatment with a bland ointment, followed by re-examination and biopsy if the lesion persists. If a lump is palpated, then both lump and nipple should be studied microscopically.

Other signs disclosed by inspection and palpation

Early skin edema may not have an orange-peel appearance but may manifest itself only as an increased shininess of the areolar skin.

Discoloration, pigskin edema, ulceration and satellite skin nodules are other

signs usually indicative of moderately or far advanced cancer. One or more of these signs are occasionally present as a result of infiltration of Cooper's ligament by mild chronic inflammatory change adjacent to a benign tumor. Unless biopsy precedes definitive surgery, therefore, even for what seems obvious cancer, there is always the risk of performing unwarranted mastectomy.

Signs disclosed only on movement and manipulation

Next in importance to the findings discoverable by careful inspection and palpation, is dimpling, or flattening seen only on movement of the breast, often only in combination with manipulation. A permanent pucker is an advanced sign, as is gross change in the direction of point, level, or rhythm of elevation of the nipple. It may be worth repetition, however, that flattening, or inversion or even permanent puckering of the skin and enlarged firm axillary nodes do not always indicate the presence of carcinoma. It is also possible to visualize a tumor by observing the location of contour change. The "proximate feel" of a lump; that is, its closeness to the finger at the location observed, heightens the possibility of carcinoma.

Uncommonly a deeply placed tumor may be adherent to the pectoral fascia and not to the skin. Such adherence is shown by a fixing effect when the pectorals are contracted. This maneuver produces dramatic results when both skin and pectoral fixation are present.

CONCLUSIONS

In our dispensary practice, fewer than 20 per cent of patients with breast symptoms are more than 55 years of age but 75 per cent of these have cancer.

The significant presenting symptoms are lump, painful lump, bloody discharge from the nipple, and eczema of the nipple. About 3 out of 5 patients have primary cancers and fewer than 1 out of 3 have benign disease. This approximates more closely than does hospital practice the expected incidence of disease in individual practice. This high possibility of cancer does not permit selection of treatment on clinical grounds alone. The margin of error always exists, unless biopsy is performed. The presence of a dominant lump is an unequivocal indication for surgical biopsy. Even the presence or absence of retraction signs does not enable one to make a certain diagnosis of the nature of a palpable tumor. Certainty is possible only by biopsy.

The diagnostic and therapeutic management of older patients is the same as that of younger age groups.

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INDICATIONS FOR, AND RESULTS OF GALLBLADDER SURGERY IN PATIENTS OVER 65 YEARS OF AGE

BROCK E. BRUSH, M.D. AND FRANK ZELLER, JR., M.D.

The Division of General Surgery, Henry Ford Hospital, Detroit, Michigan

Many patients with so-called "silent" gall stones have been advised by the medical profession that there is no need for surgical treatment and that they will probably not have trouble in the future; "just follow a diet and be careful." This advice has more frequently been given to patients over the age of 65, especially those with some degree of hypertension, and cardiac, kidney or liver impairment. It has been our feeling that these patients stand elective cholecystectomy very well—much better than they tolerate the serious complications of gall stones, which are very likely to supervene when the condition is neglected. Although it is difficult to calculate the incidence and the time of onset of these complications, it is well known that the first symptoms of gall bladder disease may coincide with the development of some serious complication which may be life-endangering. Acute cholecystitis, common-duct stone, jaundice and pancreatitis are all serious complications in any age group, but are especially so in the aged (1).

We have reviewed 100 consecutive operations on the biliary tract in patients over the age of 65, in an attempt to evaluate the various procedures which are available and to determine what may be expected from surgical treatment in this age group.

PREOPERATIVE EVALUATION

It is obvious that patients in the older age groups should have a careful and complete evaluation of the body as a whole. The time and expense of preoperative diagnostic studies of a local and general nature will be more than offset by decrease in complications and the lessened postoperative morbidity. A careful appraisal of the cardiac status is imperative, as it will usually result in a fairly accurate estimate of the patient's ability to withstand surgery. In instances of impaired cardiac reserve, preferably the cardiologist should initiate treatment preoperatively and follow the patient postoperatively.

A prothrombin test should be carried out and liver function determined. Mateer *et al.* (2) have shown that the cephalin flocculation and 45 and 60-minute bromsulfalein tests give adequate information in the ordinary case. In jaundiced patients, the urobilinogen excretion and the prothrombin test before and after parenteral vitamin K give very helpful information for differential diagnosis (2). When liver impairment is found, a diet adequate in protein and carbohydrate may bring about a satisfactory improvement in a short time (3). Kidney function tests and prostatic evaluation in the male are important. The concentration of blood sugar and nonprotein nitrogen should be determined. Important dividends

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may be realized from a routine sigmoidoscopic examination, as well as a barium study of the colon and stomach. These studies are especially indicated when a careful history reveals some symptoms which are not usually found in pure cholecystic disease.

The addition of gastric analysis and biliary drainage studies to cholecystography gives a much higher percentage of accurate diagnoses in gallbladder disease and also gives additional information regarding the physiologic status of the stomach and pancreas. Cholecystography, when the findings are positive, has been shown to be reliable in as high as 95 per cent of the cases and so needs little further substantiation. However, when there is non-filling or a vague shadow, positive findings on biliary drainage are particularly helpful. The significant data in the 100 consecutive cases are shown in Table 1.

ANESTHESIA

The choice of anesthesia for patients undergoing cholecystostomy is intercostal nerve block combined with the injection of a local anesthetic agent into the

TABLE 1

Preoperative Evaluation of 100 Cases of Gallbladder Surgery

(60 abnormalities in 52 patients)

Significant cardiac disease	43
Diabetes mellitus	5
Hepatic cirrhoses	3
Primary pernicious anemia	2
Chronic nephritis	2
Tertiary luetic lesions	3
Bronchiectasis	1
Senile dementia	1

peritoneum. Spinal anesthesia is preferred for cholecystectomy. Occasionally, cyclopropane with curare or pentothal, or nitrous oxide with curare, is used. There is a definite indication for gas-oxygen-ether in the cardiac patient with coronary disease or limited myocardial reserve.

Premedication in the patient over 65 should be light. Morphine is used in dosage rarely exceeding 8 milligrams, and atropine is preferred to scopolamine. Postoperative pain control in poor-risk patients is frequently achieved by intercostal nerve block, using an oil anesthetic agent at the termination of the operative procedure.

A prolonged general anesthetic is not well tolerated in this age group.

ACUTE CHOLECYSTITIS

Although it is admitted that operation within twenty-four hours of the onset of acute cholecystitis in patients in good condition gives excellent results (4), we have felt that better results are to be obtained, in this age group especially, if the operation is deferred. The delay permits a thorough examination of the patient, including evaluation of liver and kidney function, and cardiac status.

The usual case of acute cholecystitis will show some improvement within thirty-six to forty-eight hours after treatment is started. When improvement fails to occur, the white blood count rises, and the general condition becomes worse, the patient must be operated upon immediately (5). Cholecystostomy is always the operation of choice in the acutely ill patient (6). When it is performed under local anesthesia and through a small incision, very little trauma is added to the already burdened patient.

CHRONIC CHOLECYSTITIS

Recurring attacks of gallstone colic of a major or minor degree are frequently seen in already embarrassed cardiac patients. The symptomatic improvement in the cardiac condition following correction of cholecystic disease, has been reported many times, since it is often remarkable. The progression of arthritis is often checked when gallstones and a diseased gall bladder are removed. Gallstones are considered as a possible etiologic factor in the development of carcinoma of the gallbladder (7). We believe that so-called "silent" gallstones should be removed, because of the complications which otherwise are very likely to occur. The complications recorded in our series of 100 patients over the age of 65 years is shown in Table 2. It is readily seen that these complications will result in a greatly increased morbidity and mortality rate—very much higher than that expected following an interval cholecystectomy. These facts should be fairly presented to all patients with gallstones, and the likelihood of complications occurring when they are older and much less able to tolerate them should be thoroughly impressed upon those who delay treatment. The results of surgery performed during a quiescent interval in cases of chronic cholecystitis with cholelithiasis are excellent. The postoperative complications are usually few and, when encountered, respond readily to treatment. A soft rubber tissue drain is always used to permit the escape of any small amount of bile which may drain from the gallbladder bed. We always close the gallbladder bed, in the belief that the duodenum is less likely to become adherent.

TABLE 2

Complications of Gallstones

(100 Cases)

Acute cholecystitis	69
Empyema	15
Jaundice	29
Common-duct stone	16
Pancreatitis	8
Hydrops	7
Fistula	1
Pericholic abscess	2

EXPLORATION OF THE COMMON DUCT

Evidence has been accumulating for several years that stones will frequently be found in the common duct, even though they cannot be palpated. When

operation is delayed during an acute phase and when the patient's condition becomes optimal, common-duct surgery may be added to cholecystectomy if indicated, with little increase in morbidity or mortality (8). Opening of the common duct permits an evaluation of the sphincter of Oddi, which may be helpful should post-cholecystectomy symptoms occur. We have for several years used Bâkes dilators to dilate the sphincter in every case in which the common duct was opened. In no case has any complication or injury occurred as a result of this procedure; and it is our impression that valuable information is obtained and far fewer post-cholecystectomy symptoms may be expected. Our indications for common-duct exploration are given in Table 3 and the results of the procedure shown in Table 4. It will be noted that exploration was performed in 25

TABLE 3

Indications for Opening Common Duct

1. Palpation of a stone
2. Enlargement of the common duct
3. Jaundice or history of jaundice
4. History of biliary colic
5. Induration of the head of the pancreas

TABLE 4

Results of Common-Duct Exploration

(25 Cases)

No. of patients	No. of patients in whom stones were found
14—Jaundiced	12
4—History of jaundice	3
7—No history of jaundice	1

per cent of the patients operated on for gallbladder disease, with a large percentage of positive findings in the patients who were explored. We believe that a T-tube should always be inserted into the common duct, once it is opened. It affords an additional safety factor and also permits the obtaining of a cholangiogram.

CHOLECYSTOSTOMY

So-called "bold surgery" has no place in the care of acute biliary-tract problems in the older age group. Although a major procedure is often technically possible, it is usually advisable to perform only a cholecystostomy, and await a more opportune time for definitive surgery. Cholecystostomy is a particularly useful procedure in patients with severe cardiac disease who are troubled with repeated gallbladder attacks; their symptomatic improvement following surgery has enabled many of them to have months and sometimes years of a much more comfortable existence. Injury to the common duct is one of the more serious complications that can result from surgery; in spite of later repeated attempts at correction, a chronic invalid is frequently the result. Cholecystectomy must

never be attempted until complete assurance is present regarding the anatomy of the biliary and vascular pattern in each patient. Perfect visualization is essential, because of the frequency of anomalies in this area. Whenever this is not possible, a cholecystostomy is always advisable.

RESULTS

A critical review of these 100 cases shows that the complications of gallstones in the aged present some very serious problems. Most of these cases could have been easily and satisfactorily handled before the onset of the associated conditions and the extension of the original disease. When complications do occur

TABLE 5

Operations

(100 Cases)

	Cases	Deaths
Cholecystectomy	57	3
Cholecystectomy and choledochotomy	25	1
Cholecystostomy	18	1

TABLE 6

Analysis of Fatalities Following Operation (5 Cases)

(All patients had recurring acute attacks; 2 were jaundiced at the time of operation.)

	No. of cases	No. of days postop.
Pulmonary embolus	2	25–27
Uremia	1	6
Jaundice, cirrhosis, ascites	1	6
Rheumatic heart disease	1	1

in the aging, conservative surgery with the alleviation of the complication gives excellent results. The operations performed and the operative mortality are shown in Table 5; an analysis of the fatalities is given in Table 6. The 2 patients who died from pulmonary embolism could not be made ambulatory, because of other ailments. Pulmonary embolism remains a serious problem, especially in the aged group. Cholecystectomy was performed in 31 patients during a quiescent period for chronic cholelithiasis. There was no mortality. Since the disease in this stage is handled so well surgically, it would seem to be great folly to await serious complications before correction is attempted.

DISCUSSION

It is a well recognized fact that persons in the older age group do not exhibit the degree of leukocytosis and tenderness in response to acute inflammation that is seen in the younger group. This phenomenon, well demonstrated in so many cases of acute appendicitis, is often not appreciated by physicians when dealing with gallbladder disease. In our series, the white blood cell count was

not above 15,000 in the cases of acute cholecystitis, and rarely above 20,000 in the presence of empyema. This lowered response to infection often leaves a tender, palpable gallbladder as one of the chief complaints and earliest signs of the disease. Twenty patients of this group had a palpable gallbladder preoperatively and in 15 of these, empyema was found.

The postoperative care in older people must be individualized, due to the various other conditions which are present in addition to gallbladder disease. Careful preoperative investigation will lead to more scientific postoperative administration of fluids and other supportive measures. Early ambulation is always practiced, whenever the cardiac status will permit; if not feasible, exercises in bed are very important. Atelectasis, phlebothrombosis and pulmonary embolism have been reduced in our experience since the institution of early activity. Phlebothrombosis can be detected early by careful repeated examinations of the legs and the temperature chart (9), and prompt treatment will greatly diminish the number of pulmonary emboli.

CONCLUSIONS

1. Gallbladder surgery may be safely performed in older persons, if it is conservative and follows thorough preoperative evaluation of the patient.

2. Elective gallbladder surgery is preferable to awaiting the inevitable complications arising from untreated cholelithiasis. The increase in morbidity and mortality caused by the complications of gallstones is such that all physicians should urge cholecystectomy at an early and opportune time, before a serious situation develops.

3. Cholecystostomy is the procedure of choice in the acutely ill and poor-risk patient with gallbladder disease. It should be used when it is necessary to operate on a patient with acute cholecystitis in whom complete and satisfactory visualization of the entire biliary tree has been rendered impossible by the inflammatory process.

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IMPROVEMENT OF LONGEVITY IN ELDERLY PATIENTS WITH FRACTURE OF THE HIP*

RALPH GOLDSMITH, M.D., JULIAN A. STERLING, M.D.† AND LOUIS H. BLOCK, M.D.

The Albert Einstein Medical Center, Philadelphia, Pa.

Present-day treatment of fracture of the neck of the femur occurring in the older age group provides many effective methods (1, 2). There remains, however, the more difficult and trying problem of keeping these old people alive, in reasonably good condition, and fit to resume the measure of activity and usefulness they enjoyed before injury. We shall present, therefore, the factors in management which we conceive to be important in favoring survival, based upon our experience with 234 cases.

MANAGEMENT

Upon arrival at the hospital, the patient is sent to the x-ray department for the usual roentgenograms, allowing him to remain on the apparatus upon which he was transported. While roentgenograms are being taken, a fracture bed, with boards and a sponge-rubber mattress, is prepared; the foot should be elevated. As soon as the patient is placed in bed, Buck's extension with 10 to 12 pounds of weight is applied to the injured extremity. Sedation is provided; shock, when present, is combatted; and special care of the back is begun at once. We subscribe emphatically to the belief that these patients are "semi-emergencies," and that time must not be wasted. Their condition should be rapidly assessed and definitive treatment started as soon as possible.

The laboratory is routinely requested to make the following tests and examinations: complete blood count and hematocrit; determination of serum protein (with A/G ratio), blood sugar, blood urea nitrogen and prothrombin time; urinalysis; and electrocardiogram.

Medical consultation is requested, as well as the advice of other specialists, if indicated. An attempt should be made to operate within forty-eight hours, if the patient's condition permits; but there should be no hesitation about withholding operation if serious reversible contraindications can be corrected. We have repeatedly observed that many patients are in a state of disorientation or hallucination, that incontinence of urine may occur immediately, and that a significant degree of secondary anemia may exist. Advanced age is not a contraindication to operation. Our oldest successful operative case was in a woman of 98 years.

We employ the Smith-Peterson nail in cervical fractures and the McLaughlin nail and plate in intertrochanteric ones. A liter of whole blood is always available

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† Address: 1351 Tabor Road, Philadelphia.

in the operating room. When it is impossible to prepare the patient for operation within a week, or when it is doubtful that he will ever be in fit condition for surgery, we employ the principle of well-leg traction. For this we prefer the Roger-Anderson splint or one of its modifications, and at times we use Fay casts. Upon occasion an individual thus treated will become operable; in the meantime, the fracture has been reduced (at least in part), the patient has been made comfortable, and is in a state in which he can be moved around.

The patient is usually taken out of bed on the first postoperative day. A solid armchair is provided, since wheel chairs are easily overturned. The affected extremity is gently manipulated, all joints being flexed and extended, when the patient is being removed from, and returned to bed. As soon as possible, he is exercised in a "walker"—usually in the department of physiotherapy. Here group activity has been found encouraging and effective. When strength permits, the walker is replaced by crutches, prior to the patient's discharge.

The necessity for eternal vigilance to prevent decubitus is well known to all. We unhesitatingly employ the indwelling catheter in order to avoid the wet bed so conducive to pressure-sores. An equal degree of vigilance must be exercised to prevent or relieve fecal impaction, so frequently overlooked by the house staff.

Since April 1949, we have employed anticoagulant therapy in all cases of hip fracture. In our series, prior to the institution of this measure, there were 7 deaths from massive pulmonary embolism; there were also numerous instances of the sublethal variety. Since 1949, there has been but 1 death from this cause (unverified) and, to the best of our knowledge, no sublethal pulmonary infarction. Moreover, we have not seen thrombophlebitis as we formerly did, despite its expected high incidence in the aged. Anticoagulant therapy is begun two or three days after operation (immediately, in nonoperative cases) and continued until the patient is satisfactorily active or is discharged from the hospital.

It has been our impression that the survival rate in elderly patients is greatly influenced by their appetite. Those who maintain normal nutrition and hydration do well; those who are feeding problems are prone to complications such as decubitus, urinary infection, anemia, pulmonary edema and terminal bronchopneumonia. We have been particularly interested in the problem of nutrition, since noting that an intractable anemia often develops. We believe this anemia to be almost entirely on a nutritional basis. It is not improved by anti-anemic drug therapy, but does respond to substained high-protein intake.

We have followed a number of patients by means of serial blood volume determinations and have had our impressions confirmed by these studies. Measurement of red-cell mass (RCM) is far superior to the usual count of the peripheral blood in evaluating the blood picture in the aged and in the chronically ill. Reference to Table 1 will clarify this concept. The values represent those in an average patient:

Mrs. E. M. (aged 68) suffered a fracture of the hip, which was treated by traction. After twelve days in the hospital, the red cell mass (including a transfusion) should have been at least 1,485 cc. The exact measurement of the RCM (by the Evans blue method (3)) showed

that she had lost 165 cc. of the red-cell mass—equivalent to 14 cc. of packed cells per day. Determinations after twenty hospital days showed that she had suffered a loss of 390 cc. of red-cell mass—an average of 19 cc. per day. After thirty-six hospital days, and despite transfusions, her red-cell mass was found to be only 830 cc.—a loss of 27 cc. per day. During the 36-day interval, the patient was losing red cells at an average rate of 22 cc. of packed cells per day. This required replacement by 400 cc. of whole blood per week.

When the RCM loss is 5 cc./day or less, the patient usually is eating well and gets well. On the other hand, the patient who does not receive adequate blood transfusion and who is not eating well may suffer a loss of RCM as high 35–40 cc./day, a loss which can be fatal.

It is possible to reverse the trend towards anemia and a high rate of loss of red-cell mass by the administration of a 3,000–4,000 calorie diet, including 200–300 grams of protein. If necessary, these patients should be force-fed, even by gavage. We have frequently observed that, following a week or two of hyperalimentation, there occurs spontaneously an improvement in appetite and capacity to assimilate food.

TABLE 1

Red Cell Mass (RCM) Changes in Patient with Fractured Hip (Bed Rest)

(Mrs. E. M., aged 68)

Hospital day	Measured RCM + transfusion cells (cc.)	Final RCM (cc.)	Loss (cc.)	Loss/day* (cc.)
12	1,485	1,320	165	14
20	1,650	1,360	390	19
36	1,790	830	960	27

* Average loss/day (36 days) = 22 cc.

The use of sex hormones stimulates the appetite, increases the sense of well-being and improves the utilization of proteins. This finding is consistent with the demonstrated anabolic function of these substances.

It is very helpful to enlist the aid of a congenial member of the patient's family. Many aged individuals are quite unable to feed themselves and many are indifferent or averse to food. They become fatigued rapidly and do not eat more than a few morsels. A tactful, persistent relative may be invaluable in feeding the patient and in encouraging an optimistic attitude.

It should not be assumed that it is always possible to sustain adequate blood levels by feeding alone. Deficiencies are further corrected by transfusing sufficient whole blood to overcome the calculated deficit. The administration of polyvitamin mixtures in adequate dosage should be routine therapy. The use of antibiotics has its greatest value in the prevention and treatment of pulmonary and urinary complications.

RESULTS

Our series consisted of 234 cases. The average age of those who recovered was 70 years; of those who died, 80 years. Our youngest patient was 45; our oldest, 98 years of age.

Reference to Table 2 shows that our highest mortality rates were in the group from 70–90 years of age. Yet we now have ready for discharge 2 patients

TABLE 2

Age Factor in 234 Patients with Hip Fracture

Age (yrs.)	Discharged	Died	Total	Survival
				per cent
Over 90	4	1	5	80
80–89	46	19	65	70
70–79	61	19	80	76
60–69	53	8	61	87
50–59	19	0	19	100
Under 50	4	0	4	100
Totals	*187*	*47*	*234*	

TABLE 3

Causes of Death in Patients with Fracture of the Hip

Cardio-pulmonary disease	17
Cardiac disease	11
Pulmonary embolus	8
Cardio-renal disease	2
Uremia	2
Peritonitis	2
Cerebral vascular accident	1
Operative shock	1
Traumatic shock	1
Bacteremia	1
Unknown	1
Total	*47*

TABLE 4

Data Concerning 234 Patients with Hip Fracture

	1938–1948 (no anticoagulants)		1949–1952 (anticoagulants)	
	Non-op.	Operat.	Non-op.	Operat.
No. of patients	64	59	40	71
Deaths	14	10	14	9
Discharged	78%	83%	65%	88%
Avge. no. of days in hosp.	54	47	71	34
Avge. age (yrs.)	69	61	73	72

over 90 years old, and we have sent home 80 per cent of the patients in that group in the past.

Table 3 shows that 35 per cent (17 of 47) of the deaths were due to some cardio-pulmonary complication. We are very much interested in this group,

since we are studying their blood volume and nutrition; there may be a factor of "chronic shock" with its accompanying altered blood volume which precipitates pulmonary edema. Deaths from absolute cardiac failure are not generally preventable. Other causes of death are listed in Table 3 and indicate the importance of general management and careful scrutiny of the patient as a whole.

The use of anticoagulants has been of great value (Table 4). We have divided our series into two groups—before 1949, and after 1949 (Table 4). In the period 1949–1952, the number of patients operated on was nearly twice as great as the number not operated on. Before 1949 these groups were equal. In the earlier group our mortality rate was about 20 per cent, and the average hospital stay about fifty days. Since 1949, we have been able to operate upon a larger number of patients with an increase in survival rate to nearly 90 per cent. On the other hand, patients in whom operation was not suitable or advisable had a survival rate of only 65 per cent.

The follow-up covered approximately 95 per cent of the patients. Of these, more than 90 per cent are alive one year after discharge from the hospital. Deaths have not been due to complications of the fracture, but rather to the usual diseases of old age. A gratifying number of patients have been able to resume normal activities.

SUMMARY

The most important factors favoring survival in patients with fractures of the hip are:

1. Early operative fixation, in properly selected and adequately prepared patients.
2. Immediate nonoperative fixation, in patients unsuitable for operation.
3. Anticoagulant therapy (routinely).
4. Special effort to maintain normal nutrition and blood volume.
5. Anemia, hypoproteinemia, decubitus and intercurrent infection combatted constantly, with all possible preventive measures.
6. Early mobilization (essential).
7. Special measures to forestall mental and physical deterioration.

CONCLUSION

We have reviewed our experiences with the management of the older patient who sustains hip fracture. Important factors in survival have been analysed. Of these, early immobilization of the fracture, early mobilization of the patient, anticoagulant therapy and maintenance of nutrition are paramount and, of these, we consider the most important to be nutrition.

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AMERICAN GERIATRICS SOCIETY

THE 1954 ANNUAL MEETING

The 11th Annual Meeting of the American Geriatrics Society will be held at the Hotel Fairmont in San Francisco just preceding the meeting of the American Medical Association. The scientific sessions of the meeting will begin Thursday afternoon, June 17 and continue through Saturday morning, June 19.

Fellows who wish to present papers at the meeting should send six copies of a title and an abstract not to exceed 300 words to the Secretary, Dr. Malford W. Thewlis, 25 Mechanic Street, Wakefield, Rhode Island, **not later than FEBRUARY 1, 1954.**

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Steroid Balance and the Riddle of Cancer

STEROID HORMONES AND TUMORS

Tumorigenic and Antitumorigenic Actions of Steroid Hormones and the Steroid Homeostasis

By Alexander Lipschutz, M.D. *Formerly Professor of Physiology, Hon. M. Roy. Soc. Med. (Endocrinol.) Director of the Department of Experimental Medicine, National Health Service of Chile*

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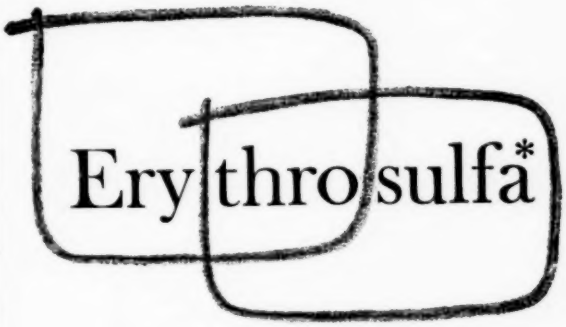

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